ethnobiology.ch
Schweiz
Suisse
Switzerland

Photography in ethnobiological fieldwork

By Franz Huber, Department of Systematic and Evolutionary Botany, University of Zürich
20 September, 2019

Why a booklet about ethnobiological fieldwork and photography?

Doing ethnobiological fieldwork, often in unfamiliar societies and environments, is an exceptional opportunity for a scientist to see and experience things, an opportunity that very few people have. You will share your work by writing and eventually publishing your thesis, but you may want to share also more of your personal experiences, and pictures are a valuable means of sharing. First of all are pictures very important for the scientific analysis and presentation of your work. Towards the end of your Master or PhD project, you need to write your thesis, prepare presentations or submit a manuscript, and you will be very glad when you thought about taking pictures of your research well in advance. Besides this practical value, research photography can thus also play an important role in the communication of your research to stakeholders and the society in general. Finally, photographs of your fieldwork will carry personal value as a means of remembering. So take some time and think about your strategy to take pictures during your fieldwork, and this booklet may give you some advice.
For more information about what kind of camera to take with you to the field, check out the end of this article. In short, you will learn that in good light situations virtually all cameras will make acceptable pictures, but as soon as you need to take pictures indoors or at twilight, a reasonably good camera will allow you to continue taking pictures, while a simple compact camera will be unable to cope with the situation and to produce acceptable results.

Documentary photos vs. “creative photography“

Photos are not just photos – depending on the objective you pursue with a photo, the result will differ. Documentary photography, for example, can mean that you visually tell a coherent story about an event, place, or certain people. This is often used in public media, but some scientific journals (e.g. Ethnobotany Research & Application [http://www.ethnobotanyjournal.org/]) have photo essay sections. In science, more often does documentary photography means that you document your research topic and your own research activities with objective, descriptive, and truthful photographs. These pictures can be used for illustration purposes (presentations, publications, etc.). Additionally, these pictures carry a scientific value as they can show information that you did not consider during fieldwork, and thus represent a valuable source of information for your scientific analysis and for future reference.

On the other side, you may want to express something additional with your photos. In this case, more “creative” or “artistic” photography is centered on the subjective intent of the photographer and shows more a personal interpretation of a scene. This kind of photos will be less important for your scientific work, but relevant for your personal uses. However, by considering and observing things with your camera that might not be the exact focus of your research, you can start a process which may open up your perceptions and eventually increase your understanding of the environment and lifeworld of the people you are working with.

The following pages will give you some tips and advice that might be helpful for your photographic work in the field.

Leave the automatic mode beside

Photography is basically capturing light with your camera. When you create a photograph, you first need to think about two basic things: How much light is present in the scene you want to photograph and does the subject need special attention to be photographed properly. The automatic mode of your camera will be able to deal with the first thing, and adjust the ISO-sensitivity, shutter speed, aperture and possibly flash accordingly to the light situation in order to produce a correctly exposed photo. However, your camera cannot deal with the second thing, namely detecting if your subject needs a specific approach to get a good picture. This might be when you don't want to use flash (for not disturbing people during specific activities or in a sacred location, for example), if you like to have an under- or overexposes picture, if you wish a long or short shutter speed (for photographing action or movements in order not to get a shaky or blurry picture, or when taking a picture out of a driving car and you need the shutter speed to be as fast as possible to get a sharp image), or if you need a very large or small depth of field (how much will be in focus, everything or just a narrow part of the picture). In these cases, you will need to leave the automatic mode and use (semi-) manual modes, e.g. the mode "shutter speed priority" to set your camera e.g. on 1/4000th of a second, and the camera will adjust the aperture (and eventually ISO sensitivity) accordingly.

In summary, automatic modes of new cameras get better and better, but especially in difficult situations or if you want to create a special look with your photo, you still need to tell your camera how you want the picture.

The light, the colors and the contrasts

You need to learn to see the different qualities of light in front of your camera and use it as a means of expression for what you want to tell with your picture. If the purpose of your picture is to purely document a given object or action, you may want everything to be sharp and well illuminated with the flash of your camera. However, if you want to show the power and fascination of a situation, you may want to focus only on a very specific part of the scene and have the background very dark or blurred, or show the dynamics of an action with some motion blur of the main subject (see examples below).

Light usually comes in association with the absence of light, with shadows. These contrasts are what create tension in your picture. While a color photo can create contrasts just with different colors, you need to have strong dark and bright contrasts in your picture especially when you take black and white pictures. To see these contrasts needs some practice, as our eyes are not naturally trained to focus on them. In direct sun light, especially around mid-day, you often have very strong shadows, creating a bright blue sky but also 'black holes' from the shadows on your picture. On the other side, a cloudy sky will diffuse the light and create a nice and soft image, with often a white, structureless sky. Accordingly, you probably want to include the sky on a sunny day, but exclude it on a cloudy day.

Very interesting are indoor pictures created just with natural light coming through a window or door, as can have your subject light by the beam of this light, while the background is kept in the dark of the house.

Rules of composition

One important part of your photographic work in the field is the documentation. As seen before, a documentary photograph will need to be well illuminated and show all items clear and well defined. Later you will be able to zoom into your picture and extract information from it, e.g. you can assess the size of an object (when you have placed a reference on the picture), you can count how many people attended the scene and who they were and where they sat, you can

locate landmarks, compare with older images from the same location etc. In other words you will include as much on a documentary picture as is needed as a reference, and the content of the picture will be relevant for the scientific analysis of your data. The large majority of your pictures will probably be of this kind. The performance requirements on your camera are not very high for this kind of photographs, a flash and a good resolution will be most important, reasonable low-light and autofocus performance an advantage.

However, if you want to bring back photos from your fieldwork that you also can print and hang on the wall of your office or decorate your computer desktop screen, you will need to change the characteristics of your photographs entirely! Now, you don't want to create a most objective picture of a situation, but you want to create an expressive, much more subjective image. You don't want to include all aspects but focus on the main issues or even a single issue and exclude from the frame what is not necessary for the message of your image. Several aspects are to be taken into account:

- Exclude from the image what will disturb and distract the message of the photo, or in other words, simplify your picture.
- This can be done by isolating the object, either by
    - blurring the background (e.g. using a widest aperture i.e. creating a small depth of field)
    - color contrast between object and background
    - moving your own position in order to exclude distracting objects from the picture
    - using a wide-angle lens to focus on the objects close to the camera, while the background appears smaller and further away.
    - Using a telephoto lens or macro lens to focus on the details of your object
- Direct the eye of the viewer to the main object, by
    - Having the main object better lighted than the surroundings
    - Having a frame (of some kind, see below) around the main object
    - Having actual or implied leading lines towards the main object
    - Using some kind of rules of composition (e.g. rules of thirds)
- With a wide angle lens, you can cover a lot of the scenery in one image. However, everything will appear relatively small, and what looks vast and impressive in reality will look rather uninteresting on the picture. Find a foreground element (rock, plants, people etc.) and get close to it, and with that the background will appear greater and more impressive on the picture.

The Basics of Photography

For a general introduction into the basics of photography, please refer to the following wikibooks:

http://en.wikibooks.org/wiki/Basic_Photography

Specific situation of ethnobiological fieldwork

Situations which you often encounter during ethnobiological fieldwork and which require special attention in advance are:

Document not only the people on the one hand and their environment (esp. plants used) on the other, but show how people actually live in their environment, how they use it, how they interact with their environment, how they use plants in everyday life and during specific situations, e.g. rituals.

That means your participant observation also includes participant documentation, including the people you are working with. As you are very involved in local people's lives, it probably will be very welcome by them when you send or bring back at least some of the pictures you have taken.

The big advantage of long-term participant observation is that people will get very familiar with you and your camera and that you learn in detail about many aspects of life, especially that you learn to anticipate events, which gives you the advantage of being prepared for an upcoming event, and be at the right time at the right spot to record it. Nevertheless there will be many opportunities for unexpected things, for close-ups and details within the larger picture, which makes your work unique and presenting your work interesting and fun. This means, keep your eyes open, don't get used and bored in a given situation, always try to find the new, unexpected, and amazing issues.

Start slowly with taking pictures, e.g. first start with objects around and inside a house, and only later, when people got familiar with you, start taking pictures of the people. When you first start with taking posed photographs of all family members, you can later more easily continue taking candid photographs in informal and private situations.

Always ask permission to take pictures of people, especially when you plan to later publish the pictures in any form (what you usually don't know in advance, so better ask anyway!).

The following pictures might give you some ideas what I was talking about:

Documentary photographs

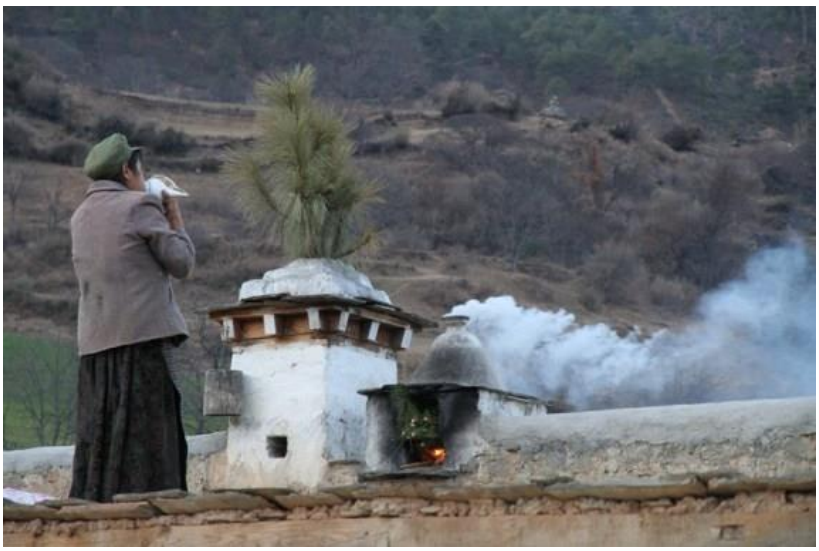


Figure 1a

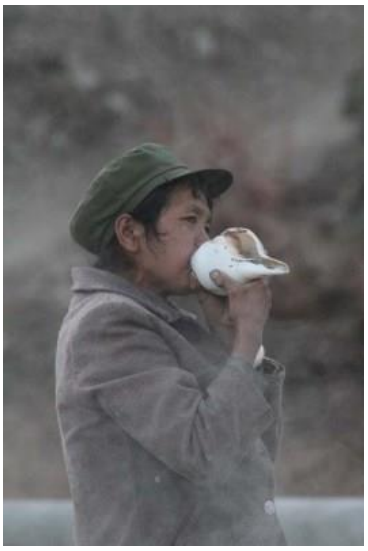
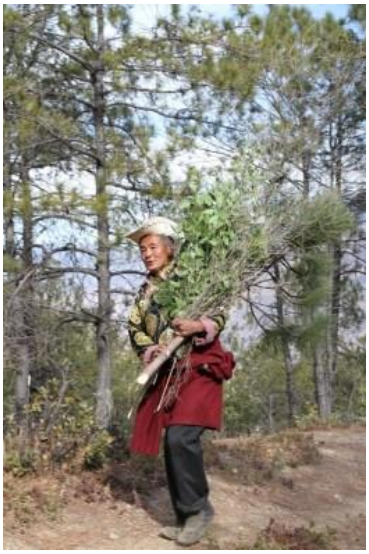


Figure 1b

Photos with a high documentary value usually have a wider angle and show more of the relevant aspects and relationships of a specific situation (*Figure 1a*). The photo can be used for illustrating your research and possibly allows for retrieving information which you might not have considered during fieldwork. The aim is to produce an objective and descriptive photograph.

The picture on the right (*Figure 1b*), in contrast, is more personal and potentially more concerned with aesthetic aspects.



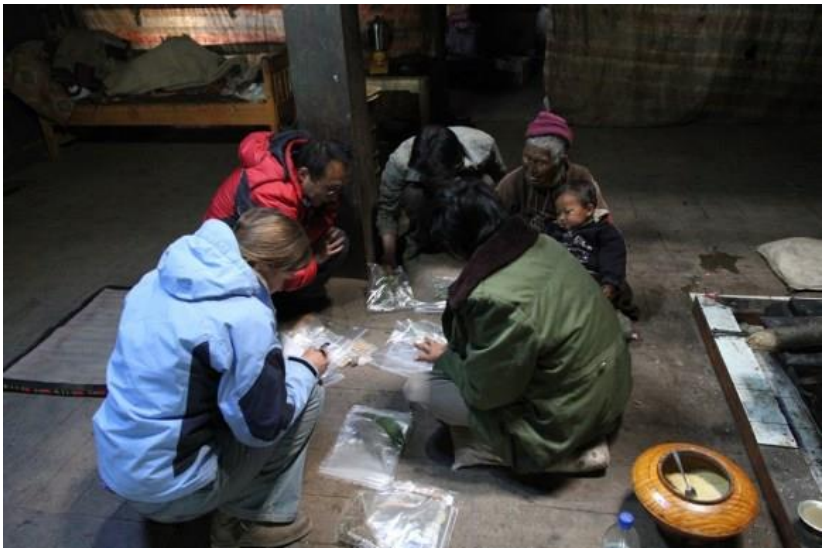


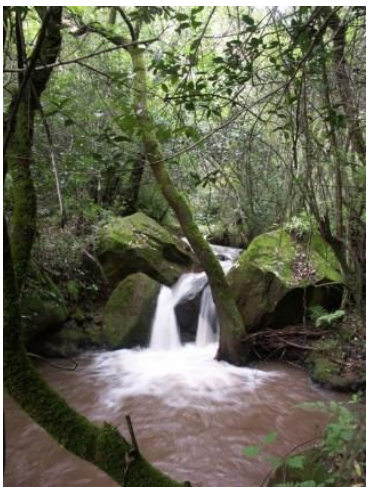
Figure 2a *Figure 2b*

Both, photographically documenting local people's livelihoods, environment and use of plants (*Figure 2a*) **and** your own research project (*Figure 2b*) are important.

Methods, camera settings, equipment

Exposure time

Long exposure: Blurred waterfall



With the relatively long exposure time of 1/5 sec the waterfall appears blurred and dynamic. If you carry a tripod with you, you can expand your exposure time to 1/2 or up to several seconds and increase the effect of the water in motion. With a tripod you additionally can set your ISO to a low value (e.g. 100 ISO = low noise) and set your aperture to a high value (e.g. f/8) to have a large depth of field.

Overcast (cloudy) sky is usually better than bright sunlight, as the diffused light will illuminate the surrounding vegetation much nicer then strong light/shadow contrasts

Figure 3) Minolta DiMAGE A2, F/3.2, 1/5 sec., ISO-100, ƒ=7mm (27mm equivalent)

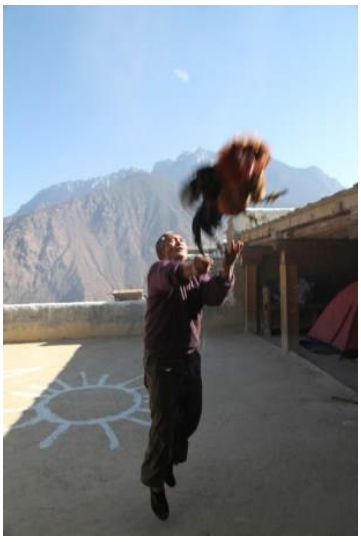
Long exposure: Night sky

Figure 4) Canon EOS 7D, F/3.5, 30 sec., ISO-6400, ƒ=17mm (25mm equivalent)

You ideally have a camera with a large sensor with high ISO capabilities. The most important is a wide angle lens (15-35mm) with large aperture (f/2.8 or larger). Kit lenses with f/3.5 as here is not ideal but still work, as you need higher ISO creating more noise in the picture. Essential for night sky photos is a tripod.

For more information see Kingham, David. 2014. Nightscape. Craft&Vision, Vancouver, Canada

Motion blur



Relatively long exposure time, to show the dynamics of the scene or certain elements in the picture.

Figure 5) Canon EOS 7D, F/7.1, 1/125 sec., ISO-100, ƒ=17mm (25mm equivalent)

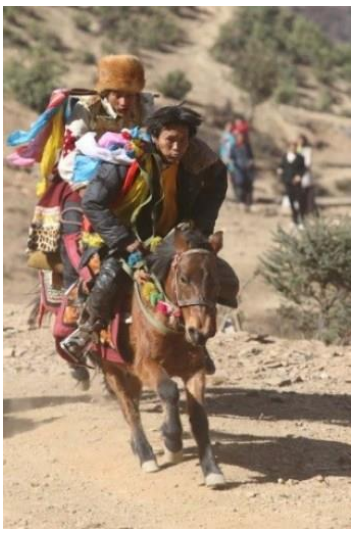
Short exposure / Fast shutter speed

This picture was taken from a moving car. A fast shutter speed was necessary to obtain a sharp image with no motion blur. When you don't have time to compose the photo calmly, try serial photographs to increase the chance of a usable picture.

Figure 6) Canon EOS 7D, F/4.5, 1/2000 sec., ISO-100, f=19mm (28mm equivalent)

Camera settings / Techniques

Fast serial



In sports photography or general situations with fast action, usually not only a single picture is taken but a whole series of pictures. This allows later to choose the best picture of the series.

As the autofocus needs to adjust between each picture, the requirements for the camera and lens are quite high.

Figure 7) Canon EOS 7D, F/6.3, 1/400 sec., ISO-100, f=220mm (330mm equivalent), 8 frames/sec

HDR (High-dynamic-range imaging)

HDR (High-dynamic-range imaging) is a tool to overcome problems with the dynamic range in a picture. When you have a situation with dark shadows and very bright sections, the camera (other than your eyes) cannot deal with this high contrast. With HDR you overlay several exposures of the same picture (exposed for the dark, the bright and the medium areas, see small pictures) and create a final picture with a suitable exposure over the whole picture.

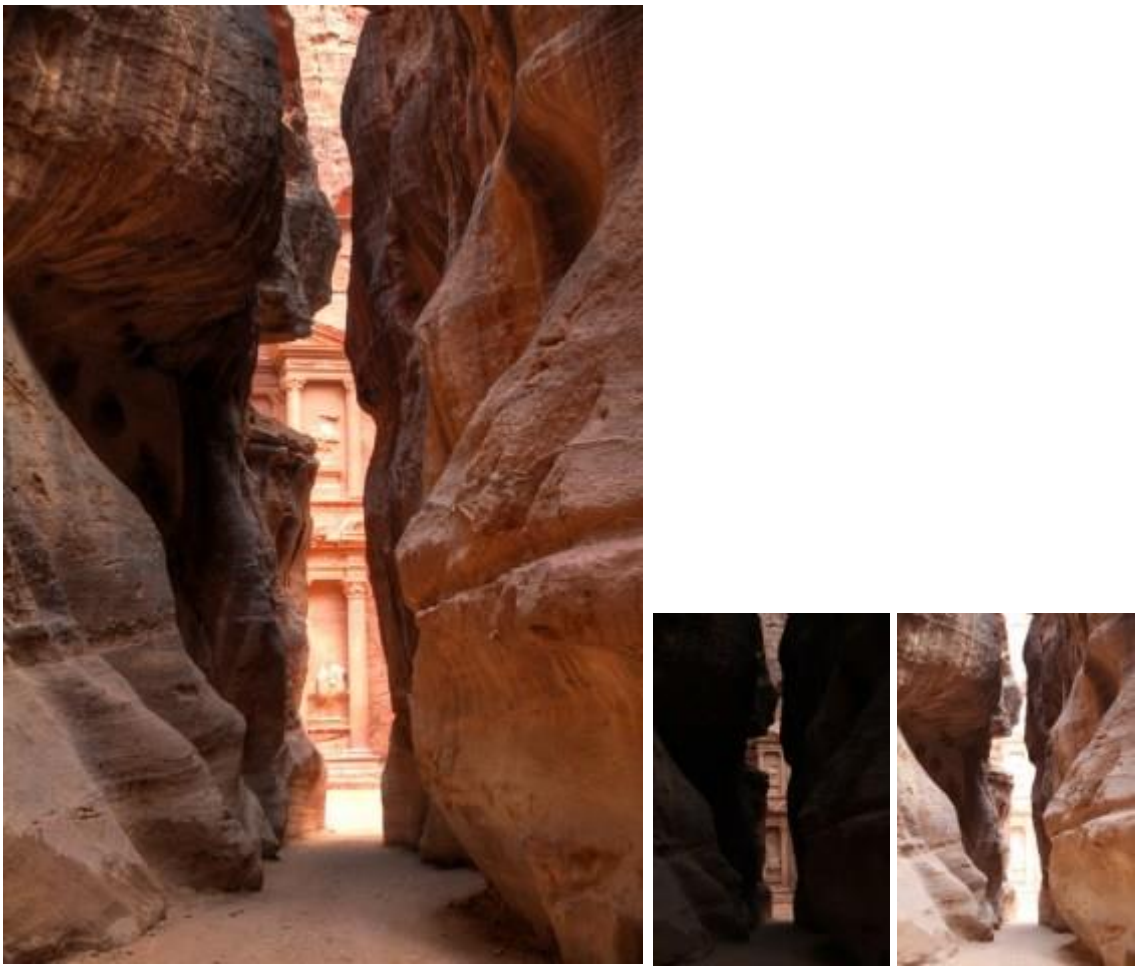


Figure 8) Canon EOS 7D, F/4.5, 1/50 sec., ISO-200, exposure bracketing +/- 2EV (stops), f=35mm (50mm equivalent), HDR function in Adobe Photoshop

Focal length

Wide Angle

The possibility of having a focus on the foreground but still a lot of room for elements in the background provides the opportunity to have multiple elements in the picture which helps to tell a story with the photo.

Figure 9 shows insulators for power lines that will conduct electricity from a series of river dams in Shuiluo, SW China, to the large cites on China's coasts.

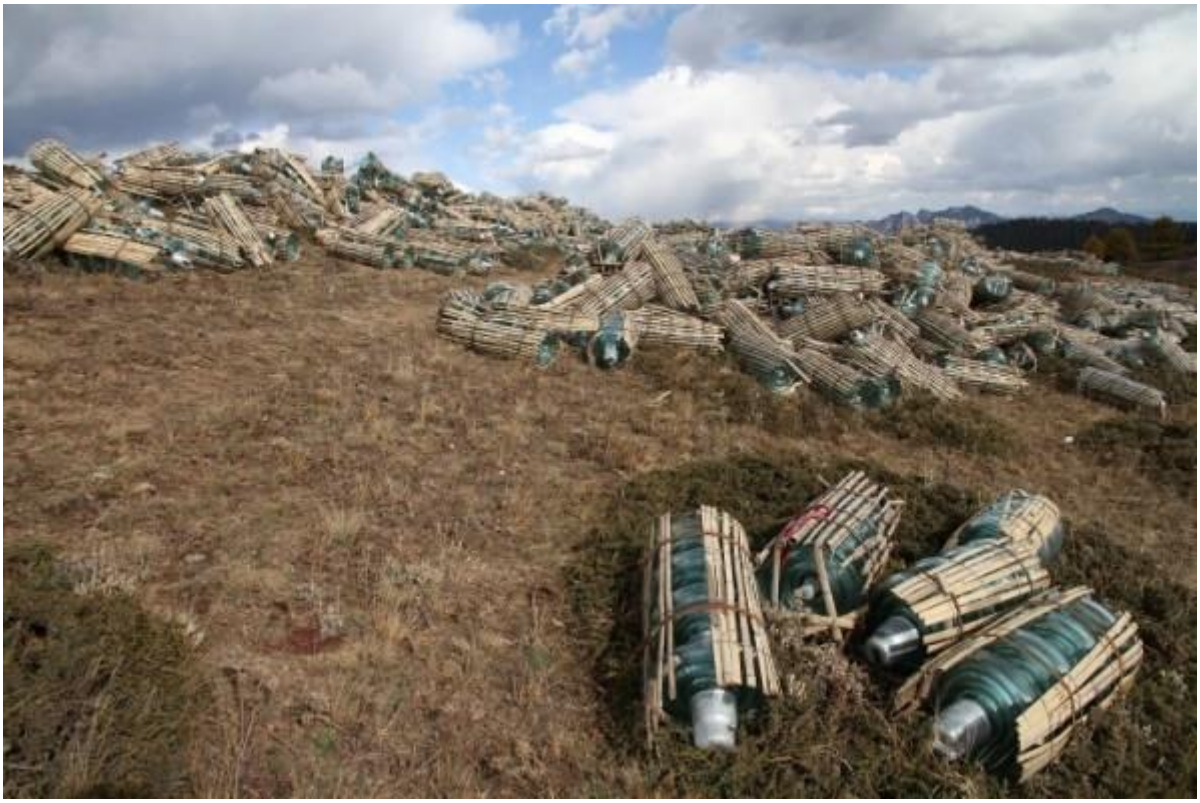


Figure 3) Canon EOS 7D, F/9, 1/200 sec., ISO-100, f=15mm (22mm equivalent)

Panoramas (stitched Photos)

Figure 4) Panorama of Lugu Lake in Southwest China stitched from 6 individual pictures with the software ICE from Microsoft

As an alternative to a wide angle photo, you can also take several overlapping photographs of a (stationary) scene taken from a single camera location and stitch the pictures together for one high-resolution panorama. All cameras have such a panorama function built in, however it is often advantageous to take the pictures and stitch them manually with suitable software (I recommend the software ICE Image Composite Editor by Microsoft Research: http://research.microsoft.com/en-us/um/redmond/projects/ice/).

Some tips:

- For panorama stitching, the set of images needs to have a reasonable amount of overlap (at least 15 – 30%, better 50%) to overcome lens distortion and have enough details for the software to detect correspondences between images and compute image alignment and blending.
- Hold the camera vertically instead of horizontally. This improves the photo quality (as you can increase the focal length a bit for the same aspect which reduces lens distortion towards the borders of the frames) and will give you a higher resolution picture.
- Try different camera modes. As you probably will have darker and brighter parts in your panorama, the camera will adjust for this in automatic mode (different exposures). For best results, use full manual mode (keep focus, ISO, white balance, aperture and shutter speed constant) and meter on the brightest part of the scene.
- Try different focal lengths. Usually, the longer the focal length, the better (at least 35mm).
- When you take the pictures, move your camera horizontally as straight as possible, and keep in mind that you will need to cut off some content on top and on the bottom of your final panorama. So, include excess “sky” and “ground”. Use a tripod in low light if available.
- You can also make double rows horizontally, Lightroom can handle this.
- Try 360° panoramas. Such pictures can quite easily be used for interactive / movable panoramas on your website.

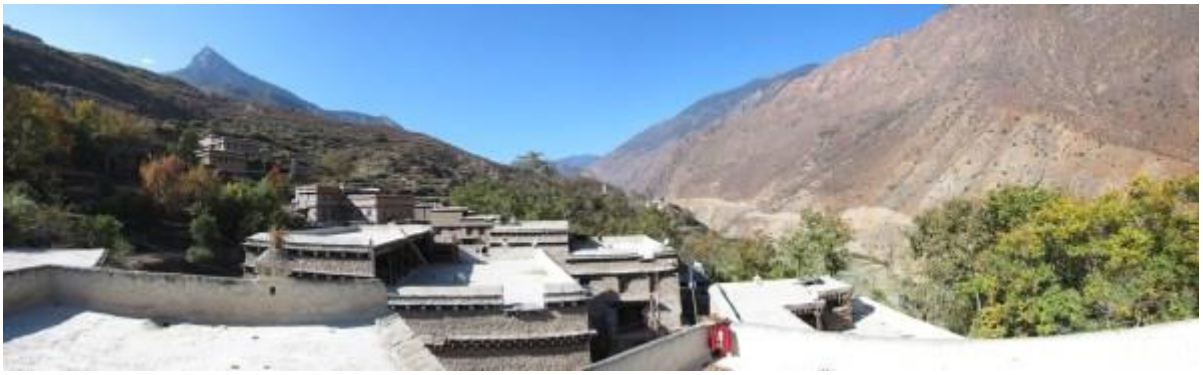


Figure 5) Panorama of a Tibetan village stitched from 4 individual pictures, with a final resolution of 9000 x 2800 pixels

Telephoto

Long-focus lenses make distant objects to appear closer and magnified. Additionally, telephoto lenses appear to compress the distances between objects, e.g. object in the foreground with its background.

Figure 6) Canon EOS 7D, F/7.1, 1/400 sec., ISO-100, f=300mm (450mm equivalent)

Low light

In a dark environment, you will often get more interesting pictures when you use the sparse natural light and high ISO instead of using a flash. Flash does not only make a picture look more flat, in certain situations, e.g. during social or religious activities, firing a flash may also irritate the participating people. Try to stay in the background and maintain a low profile.

As a low light picture is justified to be rather dark, the picture has been underexposed -0.3EV. A low light camera setting (e.g. ISO-12800, -0.3EV) can be saved as a custom profile in your camera (if available), for a quick access to these specific settings.

Figure 7) Canon EOS 7D, F/7.1, 1/320 sec., ISO-12800, -0.3EV, f=35mm (52mm equivalent) Light source: Day light, through open door. Picture: Incense burning in Shuiluo, SW China

Picture composition

Leading lines

Figure 8) Minolta DiMAGE A2, F/7.1, 1/320 sec., ISO-64, f=9mm (35mm equivalent)

Frame

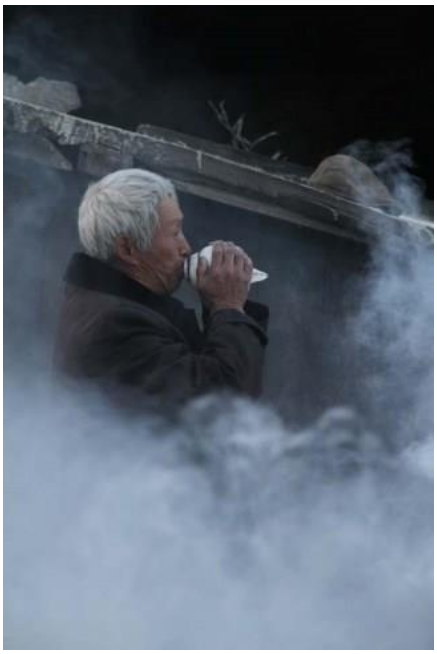


Figure 9) Canon EOS 7D, F/5.6, 1/160 sec., ISO-500, f=85mm (130mm equivalent)

By framing your main subject, you can isolate it from the background and provide strong leading lines towards the focus of the picture.

Frame: smoke of incense burning.

Rule of Thirds

The Rule of Thirds means that you divide a photo with two horizontal and two vertical lines into nine equal parts. When you place a subject at any of the four intersections of the lines, the photo will be more expressive and interesting then when the subject for example is placed in the middle of the picture. Similarly, the Golden Section can be applied for creating interesting photos.

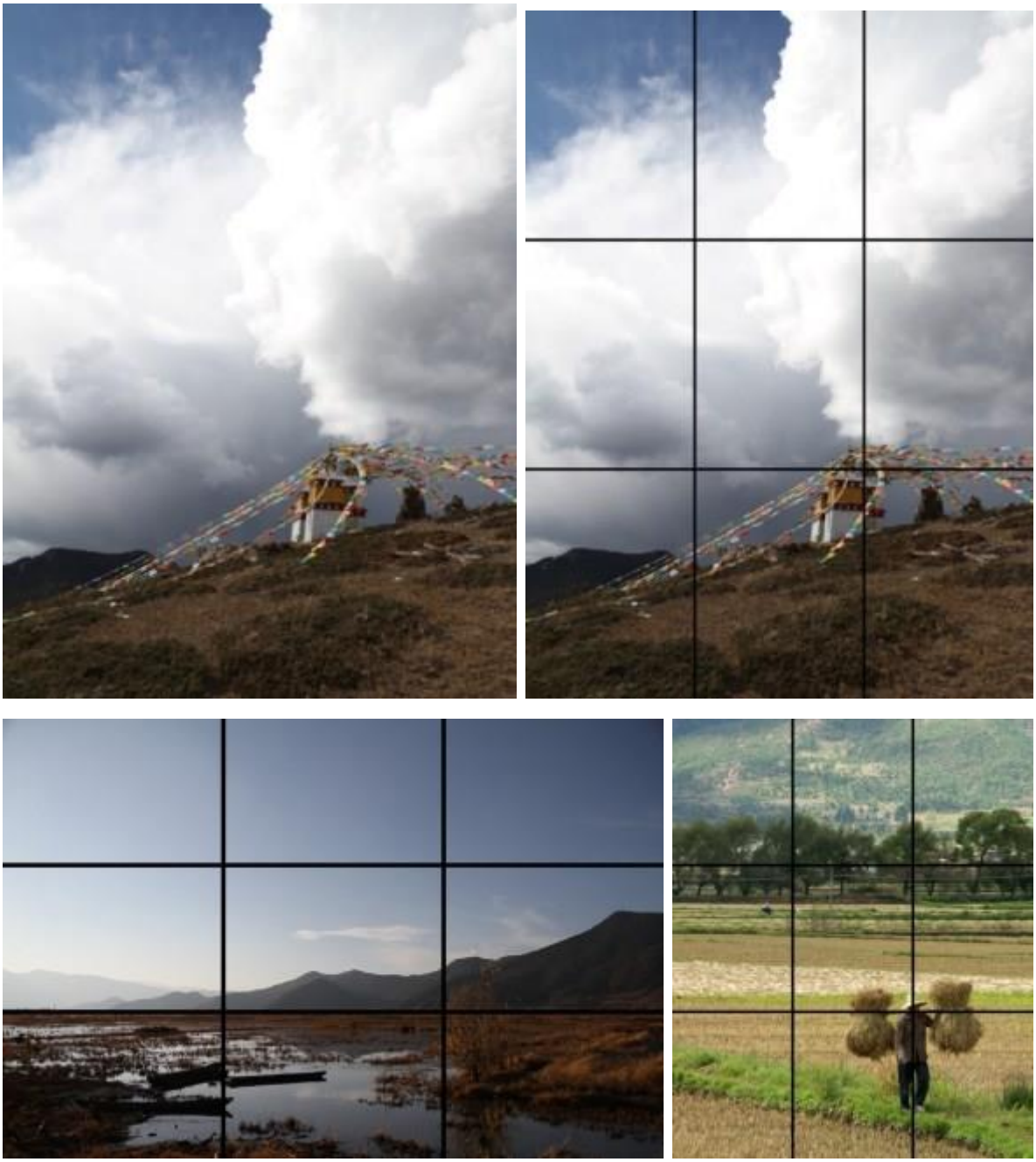


Figure 10) Canon EOS 7D, F/5.6, 1/160 sec., ISO-500, f=85mm (130mm equivalent)

Details / Close-up / Macro / Colors

With close-ups and macro photographs you can show interesting and often overlooked details. In addition, you can create more abstract pictures.

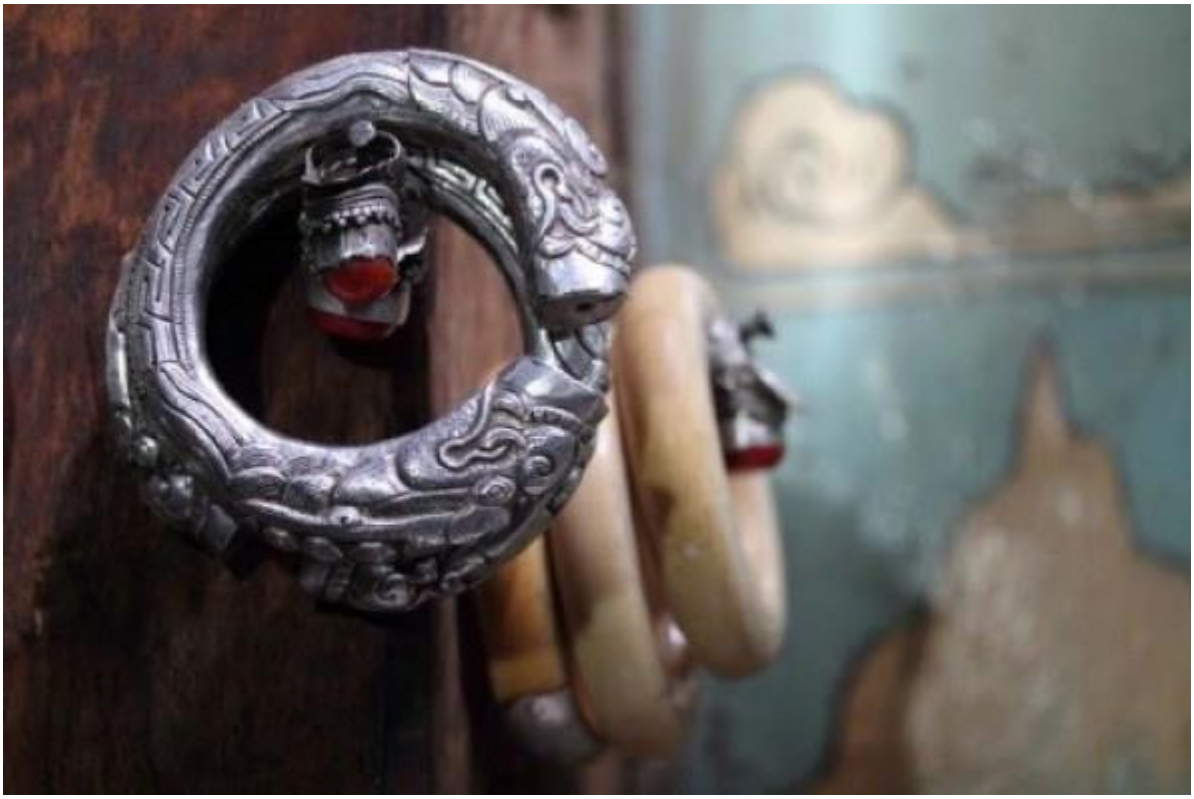


Figure 11) Canon EOS 7D, F/2.8, 1/60 sec., ISO-3200, f=60mm (90mm equivalent)

Figure 12) Iris sp. Flower and Chili peppers in Shaxi, SW China

Accessory equipment which might be helpful:

- Mini-tripod: Very helpful for long exposures and self-portraits (e.g. together with local people)
- Flash: generally not needed when you have a small flash built in your camera
- Additional batteries and memory cards (very important for fieldwork in remote areas)
- Backup possibilities, e.g. mobile hard drives, flash drives.
- Functional and inconspicuous camera bag for fast access to your camera
- Cleaning kit, including lens cleaner solution or wet towels (against fingerprints) and air blower to remove dry dust.
- Filters (e.g. protection filter for the lenses, polarizing filter) and lens hoods against lens flare.
- Pocket camera (or mobile phone) as backup camera
- Fingerless gloves are very handy for taking notes and pictures in cold environments.

Tips and advice:

- When you take pictures of people, write down their address and try to send or bring back copies of the pictures you took!
- Always photograph your travel documents, research permissions, field notes, specimens etc. as backup of your valuable original documents and data!
- Backup your photos and documents regularly on at least one, better two, additional devices. Keep them ALWAYS separately (e.g. leave a DVD behind or send it home by mail, upload the most important pictures and files to the cloud, save it on a flash drive which you keep in your wallet, etc!
- Be careful with pictures of sensitive locations and situations. Generally, smaller cameras are less conspicuous than large cameras, allowing you to keep a low profile.
- Carry your camera in an inconspicuous bag in order to avoid theft. Additionally, theft insurance might be reasonable.

See: Palakovich Carr, J. 2012. Science Photography: Communicating Research through Photos. BioScience 62(5): 458-459

Choosing the right camera for ethnobiological fieldwork

What is important when choosing a camera for fieldwork?

1. When travelling, a lightweight camera is handy
2. Good lowlight capabilities/high ISO sensitivity is important when taking pictures indoors without using the flash (important e.g. during rituals, when the use of a flash would be very inappropriate)
3. A camera that supports to keep a low profile, as people generally less object to being photographed when the camera is small and inconspicuous
4. Long battery life, as recharging the battery is not always easily possible
5. Environmental sealing against water and dust
6. Availability of good lens(es), either fixed or exchangeable. The lenses are much more important for high quality pictures than the camera body, especially in low-light situations.

There are different types of cameras, from small compact cameras to high-end dSLRs (Single lens reflex). Each type has its strengths and weaknesses, which will be discussed below, particularly in the context of the requirements during fieldwork.

Important features of the cameras to consider

Photo quality

Sensor

Sensor size: The sensor is the part of the camera, which captures the light coming through the lens. The larger the sensor, the better the photo quality (generally), but the larger the sensor, the bigger, heavier and more expensive the camera and lenses. Here you probably will need to find a compromise that fits your purpose. Sensor size of choice may be APS-C or the smaller Micro Four Thirds standard, instead of the large full frame sensors or tiny compact camera sensors (see below for more details).

Resolution: numbers of pixels on the sensor (usually measured as megapixels). Virtually every camera you find in the photo store has more than enough resolution for your needs. A major trade-off found here is that when the resolution is too high (and the sensor size too small), each individual pixel will get extremely small, leading the physical/optical problems with capturing the incoming light, leading to increased noise in the picture.

Light sensitivity: In the days of analogue film, light sensitivity was determined with the choice of the film. In bright sunlight, a film with low sensitivity (but high photo quality) was chosen, in low-light condition a film with high sensitivity but lower quality (noise, visible as ‘grain’), often a black and white film, was used. Now, the sensitivity can be changed from picture to picture, however the problem with the noise remains. Sensitivity is measured in ISO, the higher the number, the less light is needed by the camera to operate. For indoor pictures without flash, a high ISO value (e.g. 12’800 or higher) with good picture quality is important (usually it is advisable not to make use of the maximum ISO possible, as the image quality will not be very good. Usually, it will be acceptable for b/w images, however. And, after all, better a noisy picture than no picture at all). Generally spoken, the bigger the sensor, the better the light sensitivity.

Lens

The lens is the most important part of the camera; it determines how the light from the object you photograph is transferred to the sensor in your camera. A good lens is characterized by little optical/imaging errors, such as chromatic aberration (light of different wavelengths are diffracted differently, leading to color fringes, especially in the corners of the picture), vignetting (darkening of the pictures towards the corners), distortion (straight lines appear curved on the picture). Generally, lenses with a large zoom factor are more prone to optical errors than lenses with a small zoom factor or even prime lenses (lens with a fixed focal length/no zoom). Additionally, a better lens allows for more light to pass, thus being ideal for low-light situations. This means, however, that good lenses are more complex constructed, larger, heavier and much more expensive (see Tab. 1). Nevertheless, invest your money in good lenses!

Table 1: Comparison of the three available Canon 50mm lenses.

Model	Diameter front lens	Weight	Price
Canon EF 50mm f/1.8 II	52 mm	130 g	158 CHF
Canon EF 50mm f/1.4 USM	58 mm	290 g	518 CHF
Canon EF 50mm f/1.2L USM	72 mm	580 g	2,218 CHF

Lenses are described using different numbers, e.g. Canon EF 50mm f/1.8, or EF 28-135mm f/3.5-5.6 IS USM. The first term indicates the brand, class and often sensor size of the lens (EF is Canon's lens line for full frame cameras). The first number indicates the focal lengths of the lens (or the range of focal lengths of a zoom lens). While 50mm is a standard fixed focal length, 28-135mm means that the lens can zoom from wide-angle to a medium telephoto. The second number indicates the maximum aperture (i.e. opening) of the lens, indicating how much light can pass the lens. The smaller the number, the more light can pass, and thus the better usable the lens is in low-light situations. With a zoom-lens, this value can vary at the different focal-lengths (in our example 3.5 at 28mm to 5.6 at the telephoto end). Labels at the end can indicate additional features of the lens, such as Image stabilization (IS), ultrasound motor (USM), special quality of the glass or special coatings used, etc.

It gets more difficult when the camera doesn't use a full frame, but a smaller sensor. In this case, the camera needs a lens with a shorter focal length in order to map the same image on this small sensor. For example, when you have a FUJINON f=7.1 – 28.4mm for a small 2/3-inch sensor, the image you will get from this camera is equivalent to 28-112mm in a full frame/35mm format system. In order to make it easier, usually this equivalent value is indicated.

By the way, 28-112mm means that this lens has a 4x zoom. You can buy cameras with huge zoom ranges (up to 30X or even 50X zoom), but then you will usually get image quality problems at the upper and/or lower extreme ends. Additionally, only cameras with very small sensors can be fitted with such megazoom lenses. Thus, I wouldn't suggest buying such a camera, as you anyway mostly need the medium ranges.

Special lenses and equipment are usually only available for dSLRs, such as macro- or extreme telephoto and wide-angle lenses, macro flashes etc.

Performance

Autofocus

Until recently, autofocus was a major problem with cameras other than dSLRs. In dSLRs, the light entering the mirror mechanism is divided for use in the viewfinder as well as in a dedicated sensor, the phase detection (by dividing the incoming light into pairs of images and comparing them), to quickly focus the lens.

Cameras missing a mirror system (that means all non-dSLRs) have to use a different and slower system, called contrast detection. Contrast detection autofocus is achieved by measuring contrast on the sensor. The intensity difference between adjacent pixels of the sensor increases with correct image focus. The optical system can thereby be adjusted until the maximum contrast is detected. This method is relatively slow, especially for moving objects and in low light. Faster "hybrid" systems combining both contrast and phase detection are now used in mirrorless cameras (ILCs), achieving good autofocus performance in standard situations.

Battery

In the field, battery life is a very important issue, as you often cannot easily recharge your battery. DSLRs can usually take between 500 and 1000 pictures with one battery, while mirrorless cameras with their electronic viewfinders take 200-400 pictures at the maximum. While you need to buy 1 spare battery with a dSLR, you probably need 2 or more spare batteries with a mirrorless camera. However, there are cameras which operate with standard AA batteries instead of the dedicated lithium-ion battery, which could be a good alternative for fieldwork in very remote areas.

Features

Image stabilization

When taking a picture at low light, you probably will be using a slow shutter speed (= long exposure, allowing more light to enter the camera). When not using a tripod, the picture will be blurred due to your shaky hands. The image stabilization in the camera now will compensate for these movements during exposition (either by adjusting some parts in the lens or by shifting the sensor antagonizing to the shaking). Virtually all cameras feature image stabilization, without big differences between each other.

Viewfinder

In the times of film, the big advantage of SLRs was the fact that you could look through the viewfinder and the mirror system to see precisely how the picture will look like. When taking the picture, the mirror, previously directing the light into the viewfinder, swings up, letting the light pass to the film/ sensor.

However, with digital cameras, this is not necessary anymore, as the sensor not only can take the final picture, but also display the live image on a screen or in an electronic viewfinder (EVF). An EVF will have advantages especially at difficult light situations, e.g. bright sun light, when the image on the LCD screen will be hard to see.

Flash

If there is an internal flash built in you don't need a stronger external flash. A flash is useful for documentation, when a good illumination for all details is needed (e.g. copying of fieldnotes), as well as for fill-in flash in front light situations. When used in lowlight situations, the results are usually not satisfactory, you better use high ISO with natural light.

GPS

A built-in GPS receiver can be very useful, as your pictures will be geographically easily locatable, thus increasing the scientific value of the picture significantly. However, a GPS receiver will consume a lot of energy, increasing the need for additional batteries. Additionally, GPS will not, or only partially, work indoors.

If your camera does not have GPS built in, locations can easily be added manually to your pictures later.

Wi-Fi

A Wi-Fi capable camera can transfer pictures/videos wirelessly to a computer. This is, however, not an important feature during fieldwork.

However, the Wi-Fi connection can also be used to remotely control the camera with a smart phone. Even though this feature is also not central for ethnobiological fieldwork, it nevertheless can be fun to play with.

RAW and jpeg

When taking a picture, the camera will create a jpeg picture file based on the information from the sensor modified with the settings in your camera (e.g. adjusted resolution, noise reduction, color and contrast enhancements/adjustments, etc.). However, many advanced cameras will allow you to safe the original Raw-file directly from the sensor, without the modifications of your settings in the camera. This raw-file contains much more information and details than the streamlined and compressed jpeg, has a bigger file size and can only be used with special software. However this raw-file is the original or "digital negative" of your picture, ideal for further processing, e.g. for high quality prints, while the jpeg is ideal for sharing and lower quality publishing, e.g. on the web. If your camera supports raw, always use this option!

Video

Video is not a big issue when choosing your camera, unless videos are a central part of your methods. All cameras can record basic HD-video etc. However, if you need accurate autofocus during recording, an external microphone, or manual audio input control, only a selection of cameras will meet your needs.

Design

The better you like your camera, the more often you will use it. The camera should fit into your hands, and you should be able to understand the logic of the buttons and the menu, in order to change settings in time and not to miss the situation to take your picture.

Which camera might be ideal for you?

The principal message from the text above is: There is no perfect camera, there are always trade-offs! If you want to have best image quality and fastest performance, you need a large, heavy, and expensive camera and lens. If you want a small and handy camera, you have to accept limitations in image quality and camera performance.

Important: Try different cameras before you decide which to buy!

General overview of the different types of cameras:

	Compact	Megazoom	Prime compact	Entry–level mirrorless	Entry–level dSLR	Prime mirrorless	Prime dSLR
Picture quality:	2	2	3	4	4	5	5
Autofocus:	1	1	2	4	4	4	5
Lowlight:	1	1	3	4	4	5	5

Weather sealing:	1	1	2	3	3	4	5
Expandability:	1	1	1	3	4	4	5
Video:	2	2	2	4	4	5	5
Price:	4	4	3	3	3	2	2
Size/weight:	5	3	5	4	2	3	1
Unobtrusiveness:	5	4	5	4	2	3	1
Points total:	**22**	**19**	**26**	**33**	**30**	**35**	**34**
Key characteristics:	Very small and always in your bag, but slow and low photo quality	Large zoom range in a relatively small body, but slow and low photo quality	Small but good photo quality, however relatively slow	Small but good photo quality, however relatively slow	Built quality (esp. lenses) insufficient, however good photo quality	Relatively small, great photo quality, recently fast development	Great pictures in all situations, heavy, robust, expensive, complex to learn, wide variety of lenses available.
Bottom line:	Use your mobile phone camera instead	Good for bright sunlight, major shortcomings in difficult situations	Good backup or second camera	Probably the perfect choice for fieldwork, but you may go for the prime-model	Not what you are looking for in the field	Probably the best camera for fieldwork: good, fast, light, unobtrusive	The perfect choice for action and nature photographers, usually overkill for fieldworkers

1=poor; 2=acceptable; 3=good; 4=very good; 5=excellent

Further information:

http://www.cameralabs.com/

http://www.cnet.com/topics/cameras/buying-guide/

http://www.cnet.com/topics/cameras/best-digital-cameras/

http://www.cnet.com/how-to/photography-101-learning-the-ropes-with-your-new-camera/

http://www.tomsguide.com/us/dslr-vs-mirrorless-cameras,news-17736.html

http://www.digitaltrends.com/photography/beauty-without-mirror-best-mirrorless-compact-system-cameras/