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Bringing together local ecological knowledge, anthropology & landscape ecology to understand the impacts of socio-ecological changes on rural communities in South-western France

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The story of bird disappearance from rural France
A hot topic

« The birds disappear from the French countryside at breakneck speed »
This catastrophic decline of one-third in fifteen years is largely due to agricultural practices according to CNRS and Museum researchers.

From Le Monde Journal – 03.20.2018 By Journalist Stephane Foucart

Quote from the paper: « Spring may be silent this year. The Museum of Natural History and the National Center for Scientific Research announce Tuesday, March 20, the main results of Breeding Bird Surveys on the French territory and evoke a phenomenon of "massive disappearance", "close to the ecological disaster » . "The birds of the French countryside are disappearing at a vertiginous speed, specify the two institutions in a joint communique. On average, their populations have reduced by a third in fifteen years". »
Looking at birds to understand changes…

Birds as indicators for ecologists and scientists

Birds, especially long-distance migrants, are good indicators of socio-economic, environmental, and climate changes, as well as seasonal variations for ecologists.

In South-Western France, the joint effects of landscape changes and climate warming result in an increase of **warm-dwelling birds**, a decline of **cold-dwelling birds** and new species colonizing such as the black-shouleled kite *Elanus caeruleus* (Gaüzère et al. in prep).
Looking at birds to make sense of changes…
What about local stakeholders?

- **Context**: Rural and periurban areas are affected by global environmental changes that are not always easy to perceive for local communities.

- **Background**: Researchs on local indicators through ethnosciences document indigenous knowledge on changes and adaptation attempts (Berlin, 1992; Veteto & Carlson, 2014; Crate & Nuttall, 2009). Local indicators are linked to traditional knowledge, to empiric experience of the land and depend also on cultural and individual characteristics (Crate & Nuttall, 2016; Orlove et al., 2003).

➤ **Research questions (within the framework of ANR Piaf project)**: Are local diagnostics of environmental and socio-economic changes built through bird observations? Is there a difference between local and ecological indicators? How indicators can be used for adaptations at a local scale?

What is a local indicator, what is an ecological indicator?
Birds as indicators in South-Western France? From protected to urban areas

- **South-western France**: LTSER site studied by ecologists and social scientists since 1980’s,

- **Urban / Rural / Protected** areas: house-centered system, mixed-farming AND sociological changes (rural exodus, peri-urbanisation & arrival of new comers),

- **Ethnographic investigations**: semi-directed interviews, freelists, observations…

- **150 interviews**: old timers & new comers (arrived in the 2000’s), land users, nature managers; **60 freelists**.
Freelisting is a method of free elicitation to get sense of the local knowledge: informants were asked to list all the birds species they knew, then to comment on the changes affecting the birds within (or outside) the list (See Borgatti, 1999, Winkler-Rhoades, 2011).

The lists were jointly analyzed by anthropologists and ecologists using the underlying statistical significance of the cited bird names with the FLAME / FLARES softwares (Wencelius et al., in press).

Local peoples’ bird lists to be compared to ecological indicators from scientific surveys, to identify common species, or potential mismatches?

Interesting method but with some limitations (limited part of the local knowledge accessible to interviewers – to be completed with in-depth interviews and participant observations).
Birds as indicators in South-Western France? From protected to urban areas: connections to nature

Informants with the same cultural background but differences between the studied sites:

- **Protected area**: traditional agricultural household (breeding mainly), lots of tourism and conservation incentives and people working for protected areas.

- **Rural Area**: Traditional agricultural household (mixed farming) in the area for multiple generations / New comers mainly retirees from Northern Europe.

- **Urban area**: Peri-urban population, young commuters working in Toulouse, few farmers and connexion to the land weaker than the 2 other sites.

Will those differences and various connections to the environment have an impact on the knowledge on birds, diagnostics of changes and local indicators within the 3 sites?
Birds as « indicators »...?
Are birds indicators for local stakeholders? Differences in the main cited species in the 3 sites?

**PROTECTED**
- Gyps fulvus  | Vautour fauve
- Aquila chrysaetos | Aigles
- Gypaetus barbatus  | Gypaète
- Turdus merula  | Merle
- Passer domesticus  | Moineau
- Corvus corax  | Corbeau/corbeaux
- Tetrao urogallus  | Grand Tétard
- Pica pica  | Pie
- Columba palumbus  | Palombes
- Hirundo rustica  | Rips Hirondelles

**RURAL**
- Parus major  | Aigle/faucon
- Buteo buteo  | Buse
- Columba palumbus  | Palombes
- Passer domesticus  | Moineau
- Columba livia  | Pigeon
- Carduelis carduelis  | Carduelis carduelis
- Erithacus rubecula  | Rouge-Gorge
- Perdix perdix  | Perdrix
- Pica pica  | Pie

**URBAN**
- Columba livia  | Pigeon
- Aquila chrysaetos  | Aigles
- Hirundo rustica  | Rips Hirondelles
- Chroicocephalus ridibundus  | Mouettes
- Pica pica  | Pie
- Parus major  | Aigle/faucon
- Passer domesticus  | Moineau
- Streptopelia decaocto  | Tourterelle
- Buteo buteo  | Buse
- Erithacus rubecula  | Rouge-Gorge

10 most frequently bird species cited per sites

The most cited species are relevant with the local compositions of the avifauna.

First species cited:
- in protected areas  ➔ Griffon vulture
- in rural areas  ➔ Blue tit
- in urban areas  ➔ Common pigeon
Are birds indicators for local stakeholders? Do the urban informants know less about birds?

We hypothesized that urban informants will know less about birds than rural ones, but unexpectedly each urban informant cited in average more species (26 for 17 in the protected area) and cited more exotic and domestic species: urban people do NOT know less bird species than the others.

However, they tend to cite altogether fewer and more local generalist species, while in rural and protected areas FLs showed more specificity and diversity: informants from these areas have a more detailed knowledge on birds than urbans.
Are birds indicators for local stakeholders? When freelists show site differences in bird perception

Stakeholders’ freelist comparisons based on bird species citations

In urban areas, informants tend to cite a large diversity of birds, including urban-dwelling species (House sparrow, Common pigeon) which population dynamics are linked by them to urbanisation.

In rural areas, typical farmland and game birds are cited (Grey wagtail, Wood pigeon) some decreasing / increasing as a sign of farmland intensification.

In protected areas, iconic birds of high conservation value are cited (Capercaillie, Bearded vulture) which dynamics are associated to land abandonment.
Are birds indicators for local stakeholders? Are birds cited in proportion of their local abundance?

Overall response is YES but some bird species are far more cited than their actual presence in the local environment due to conspicuousness and comensalism with humans.
Are birds indicators for local stakeholders? ≠ / = between local & ecological indicators

- **Some common diagnostics:** for example the decrease of barn swallow is observed by both local people and ecologists, but not linked to the same causes (loss of habitat for the local stakeholders / using of pesticides and global climate change for the ecologists),

- **Some opposite diagnostics:** more robins for local stakeholders when ecologists show a decrease: the difference is mainly due to the habitats where these observations are made.

- **What makes a species an indicator:** abundance, distribution, population dynamics, changes in behavior patterns... but also cultural significance. **Local diagnostic can not be understood without linking the species to their cultural significance,** to sociological as well as environmental changes.

<< Barn swallows are decreasing because of the closing of the barns in the area, they can’t find a place to build their nest anymore, farms are being abandoned, the farmers who are staying build big closed barns without timber frames. Old farms are disappearing as birds >> (Farmer, 52yo, rural area SW France)
Are birds indicators for local stakeholders? People in protected area more willing to conserve?

- In protected areas people are influenced by local discourses on biodiversity conservation and on the species to protect but not many actions are taken locally...

- ... When unexpectedly, it is in more banal areas (rural areas without apparent conservation issues), that people seem to see the changes and are the most likely to be affected by discourses about the future of their environments and to adapt and act,

- Strong connection to the land such as livelihood based on nature, multiple generations living in the area and oral transmission of knowledge seem to make stakeholders more aware of the occurring changes in a holistic way, of phenological changes and of the necessity to adapt.

« We decided to create this commission with people from the village because we wanted to do something together to take care of the area to make it more beautiful and more safe as well. We are trying to stop using herbicides in the public land, as it is bad for the environment, for the insects, the birds... » (Farmer’, rural area, 22 yo)
Conclusions and perspectives: Refining and comparing the categories

- **Conclusions and main results:**
  - Birds are good cues of seasonal and meteorological variations but mostly of sociological, land cover and land-use changes: environmental and sociological changes can not be fully disentangled from local peoples’ point of view,
  - Residents in protected and rural areas do not know more species than the urban residents but have a more detailed knowledge on bird species ecology due to agricultural connections to the land and its biodiversity.

- **Work in progress**: more analyses to come to compare the sites along gradients of changes, uses and knowledges and within each studied site, between types of informants (native/non-native etc.), between local stakeholders and ecologists or bird life attributes (small/large birds; day/night birds etc.).

- **Perspectives**: the present research takes place within a larger ANR research program: (how) are birds perceived as local indicators in other local communities from other countries from both the South and the North? What about other indicators of changes? And what is an « indicator » in such a context?
Thank you for your attention!

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Are birds indicators for local stakeholders? Undesired species as indicators of a mix of changes?

- Local discourses mainly on undesired species linked to land-use changes: old species that have lost their traditional uses.

- Endangered species linked to land-use changes, lost of their habitats and of some traditional uses that helped maintain the populations.

- Mentions of migratory birds as indicators of meteorological variations not directly linked to climate changes. Changes in migratory birds behaviour often linked to other environmental as well as sociological changes (e.g. changes in agriculture): a matter of scale and of holistic view of the changes.
Are birds indicators for local stakeholders? Mismatches between ecological and local diagnostics?

What does these mismatches tell us about diagnostics of changes, variability of knowledge and the possibility to compare, associate or combine different types of diagnostics, for example within conservation attempts?

What are the indicators? Indicators of what changes?

Some contrasted general diagnostics between ecologists and local people about avifauna population dynamics in rural area: ecologists count less birds and see new species when local inhabitants tend to see/hear more birds (except for swallows).