agMOOCs
Drought Risk and Vulnerability Assessment_ a global perspective
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Welcome to this talk on drought risk and vulnerability assessment, a global perspective. This talk is part of the MOOC on GIS applications in agriculture. My name is Balaji. I work for the Commonwealth of Learning. My co-author in the stock is Dr. Nagarajan who's the lead faculty in this course. Another co-author is Dr. Shridhar based in India.
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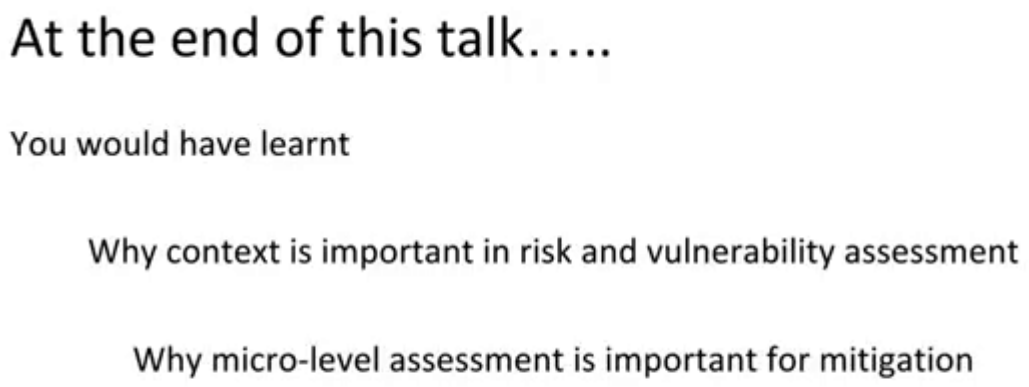

At the end of this talk you would have learned why context is important in risk and vulnerability assessment. Context is important in risk and vulnerability assessment. Why micro level assessment is important for mitigation. Micro level assessment is something we spoke about in another lecture and that is very button for mitigation.
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Importance of Context

Vulnerability

can be offset by

Adaptive Capacity

Importance of context must be known to everyone. We all by now understand what it is to assess vulnerability and we learnt at in the earlier part of the course about adaptive capacity. Adaptive capacity is essentially local capacity to adapt to drought. It is estimated using local parameters. For example your farmers are able to follow advanced water conservation practices then the impact of drought would be much lesser on them. That is their adaptive capacity. And it has a role in final assessment of all vulnerability. That's why contextual information is very important in planning drought mitigation.
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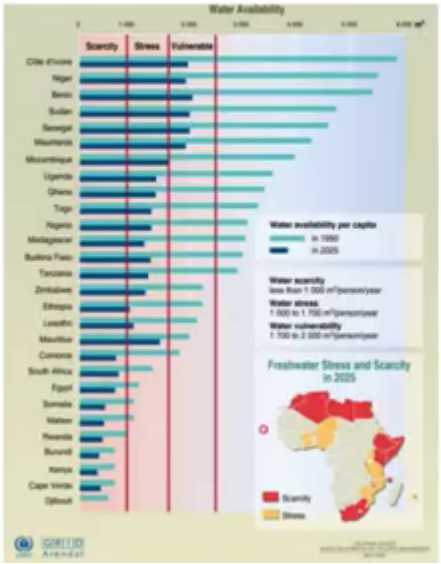
Very Large Scale Overview of Vulnerability



http://dx.doi.org/10.1016/j.wace.2014.04.004

Let us look at vulnerability assessment from a very large-scale overview. Here is an overview of an entire continent presented in terms of vulnerability to water shortages, water availability

is estimated in per capita availability and different parameters or set up measure vulnerability all the way to scarcity. What you see from this map is that almost all countries in Africa are vulnerable to water shortages and some almost one-third are facing scarcity, acute shortages of water in fact. But then this overview takes place at the level of a whole continent.
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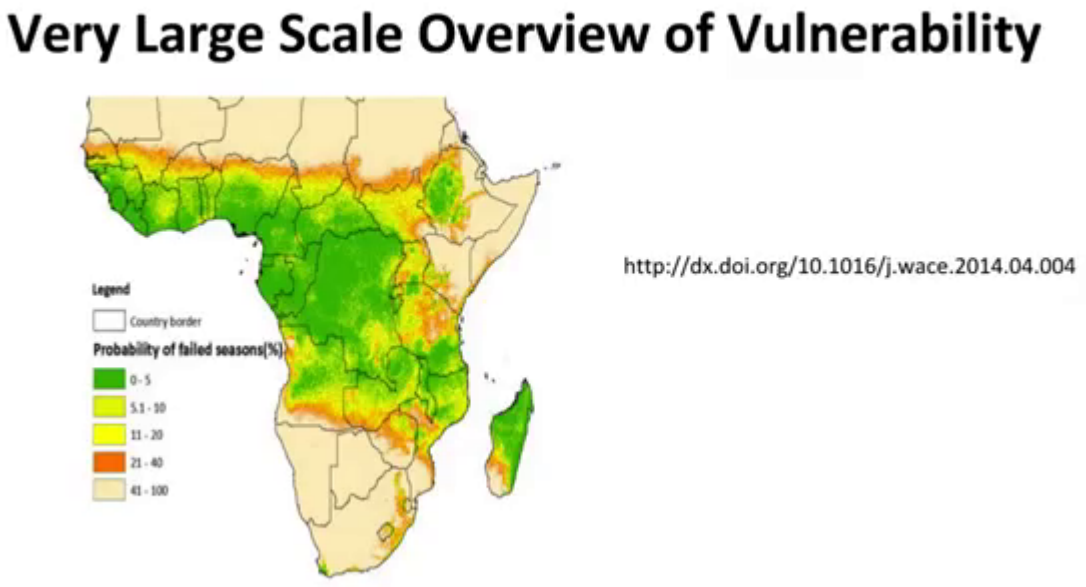

Here is another view of vulnerability to drought, again it's on a continent scale you find that quite a good part of the continent is highly prone to failed rainfall, failed season rather, and whenever such failures occur serious food shortages can set in and cause the immense stress to large chunks of human and animal populations. And this is a known phenomenon. And this is very clearly visible from a continental scale overview. But we -- to plan actual action at ground level by national and our local agencies, we need another view, a higher resolution view.
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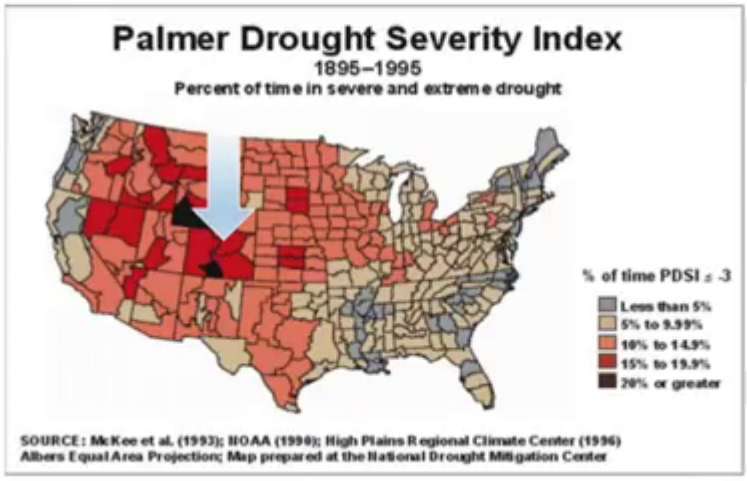
Example: Colorado State, USA

http://cwcb.state.co.us/water-management/drought/documents/statedroughtmitplan2013/coloradodroughtmitigationresponseplan2013.pdf



Let's take an example from here. This example comes from United States from Colorado. If you look at this map displayed here it displays results of Palmer Index Severity over a period 100 years and when you look at Colorado marked here in -- marked here with an arrow, you find that it is one of the worst affected states and in fact it looks like it has no practically no region at all which is not severely drought from. And we need to hover to plan action in the state authorities. They've looked at it from a higher resolution.

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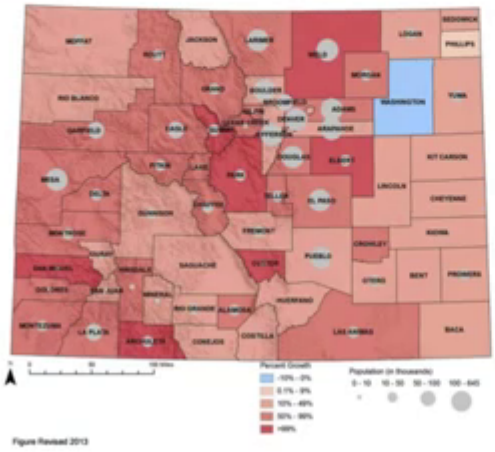
Colorado State, USA: Population Growth (estimated, 2013)

http://cwcb.state.co.us/water-management/drought/documents/statedroughtmitplan2013/coloradodroughtmitigationresponseplan2013.pdf



For example look at this map which shows county borders and it also shows potential population growth in the state.

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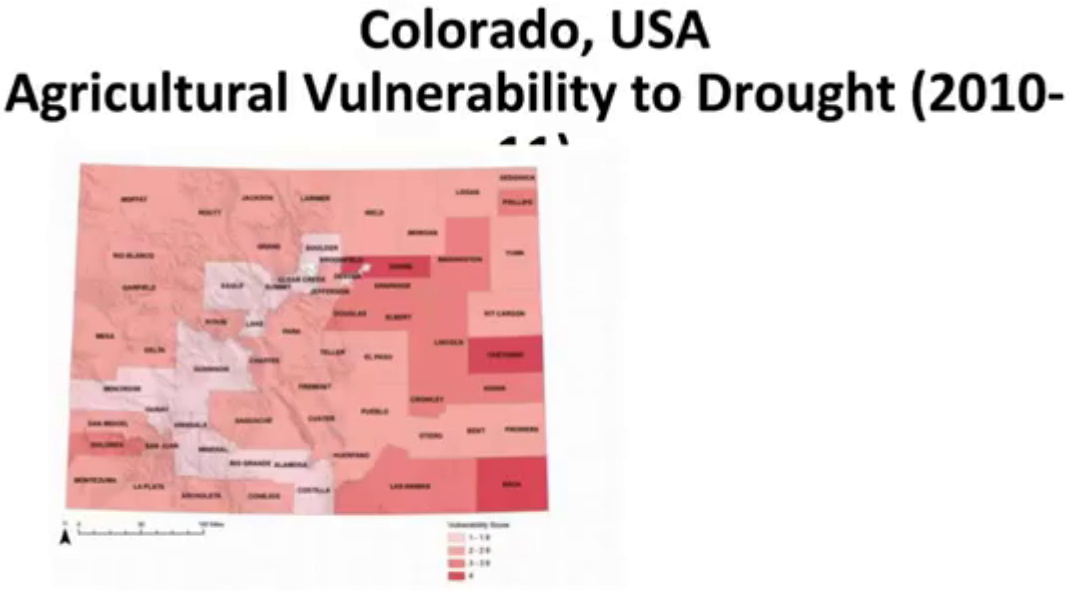

http://cwcb.state.co.us/water-management/drought/documents/statedroughtmitplan2013/coloradodroughtmitigationresponseplan2013.pdf

And a similar map that's available at the same scale to convey to agricultural vulnerability to drought. And what you notice here is that agricultural vulnerability is not uniform, it's not uniformly severe. That is a view you got when you looked at it from a country level overview. And now when you go down to this level of overview you find that there are in fact spots that are not affected by drought very much at all. So there's a reasonable variation here and this is visible only when we went down to a higher resolution or to a different level, not from the global or country level.

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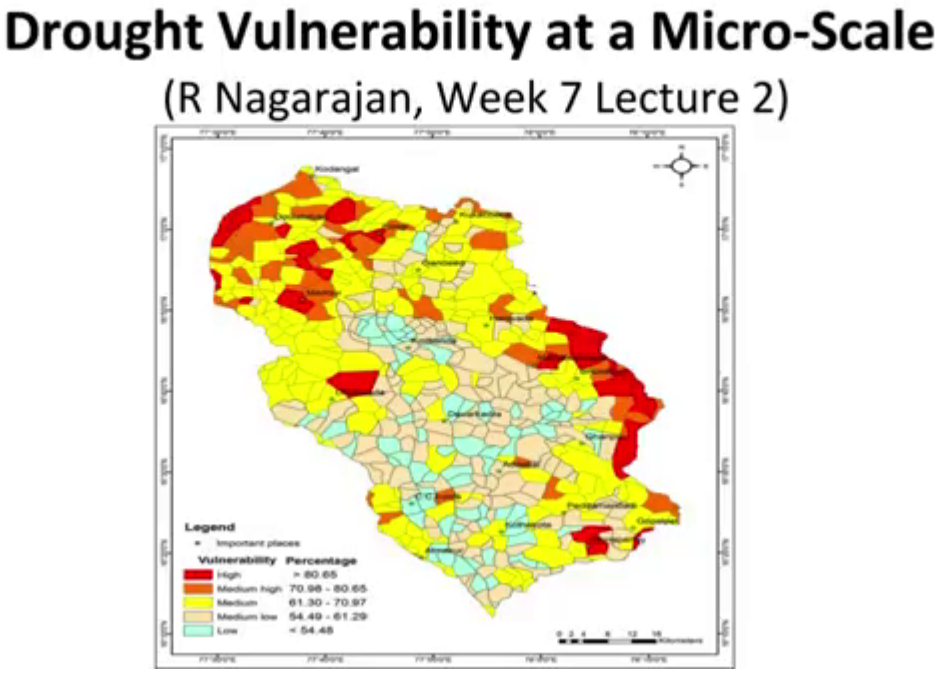

We look at one more example you looked at this map for of drought vulnerability at a micro-scale for a cluster of about 300 villages in South Central India, it was presented in one of the

earlier lectures where you look at drought vulnerability from here what you would estimate is that just over half the villages here, almost 150 villages are reasonably and highly drought prone. That's a result that you get by making -- by looking at this assessment.
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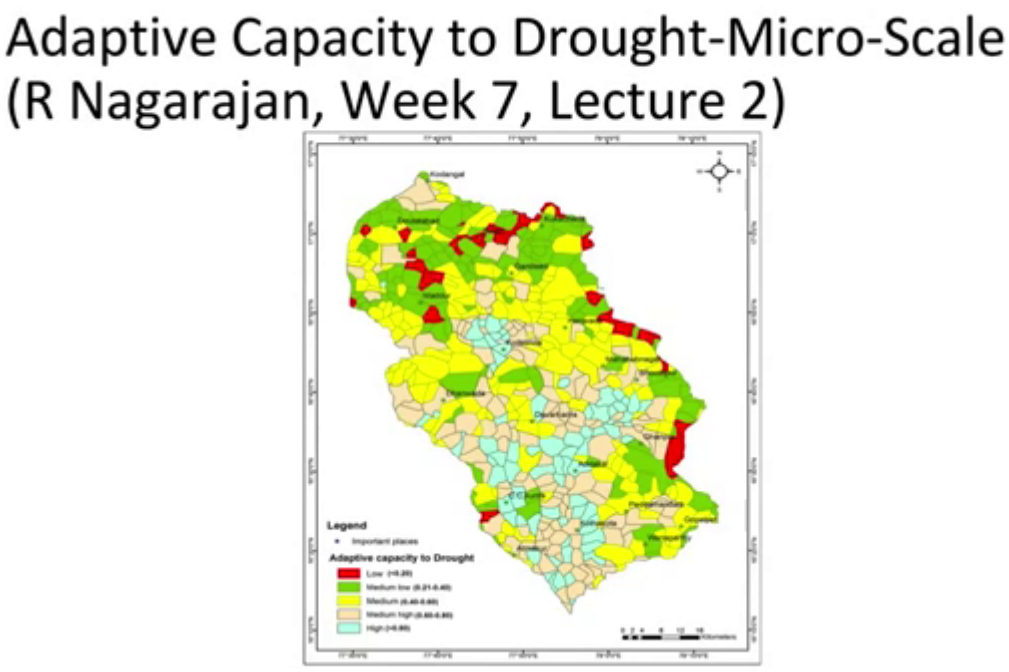

Now when you combine this with adaptive capacity which was also presented in an earlier lecture and that lecture also discussed how adaptive capacity is computed, calculated. When we combine adaptive capacity which is presented in this map with vulnerability which is presented in an earlier map here you would conclude that more than half the villages are less vulnerable to drought, which is very different from the conclusion you arrived at, that's because you are able to combine contextual information with information available only from overviews.
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GIS can help mitigation at micro level. Mitigation is action planned on the basis of contextual information. When you combine GIS tools you can offer more precise plant, crop planning advisory, you can give far more targeted advice on local water rights management and you can offer advice on very very advanced conservation and very focused conservation practices both for water as well as for forest sources management and the number of these possibilities can be listed.
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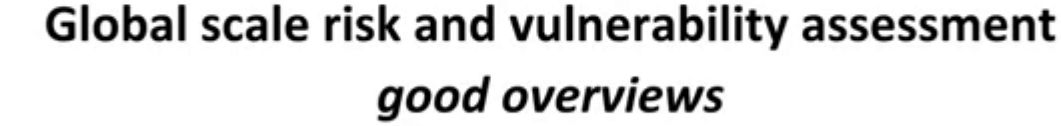

In summary global skill risk and vulnerability assessment is important. It gives very good overviews and can help national and international agencies prepare.
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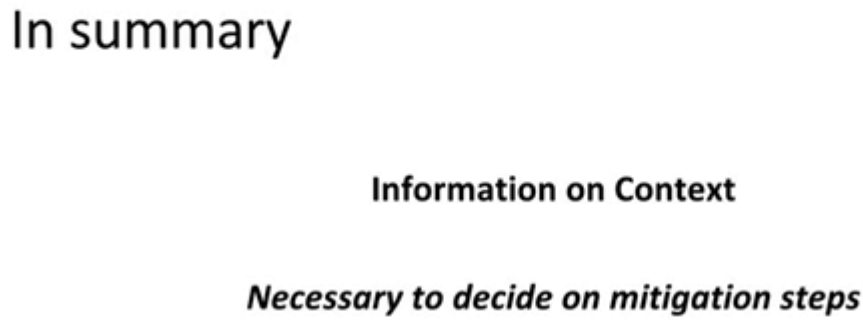

Whereas information on context is necessary to decide on mitigation steps.
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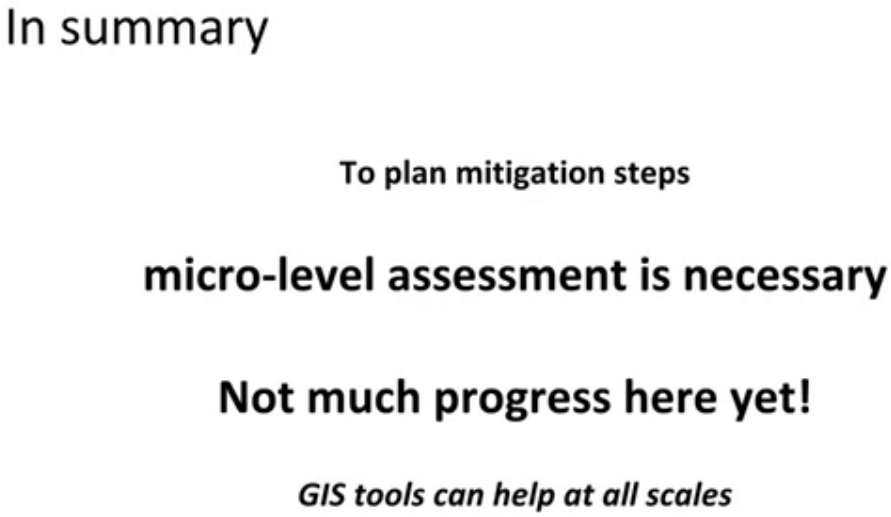

To plan very effective and very very focused mitigation steps micro-level assessment is necessary. Except for what you have seen in this course there is not much progress in this area. GIS tools can make a very big contribution here. Here is where many of you who are from agricultural science background, we have students or faculty, you would be able to build enough capacity among key actors in the local areas in helping formulate micro-level assessment. That would be a big contribution this community can make.
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