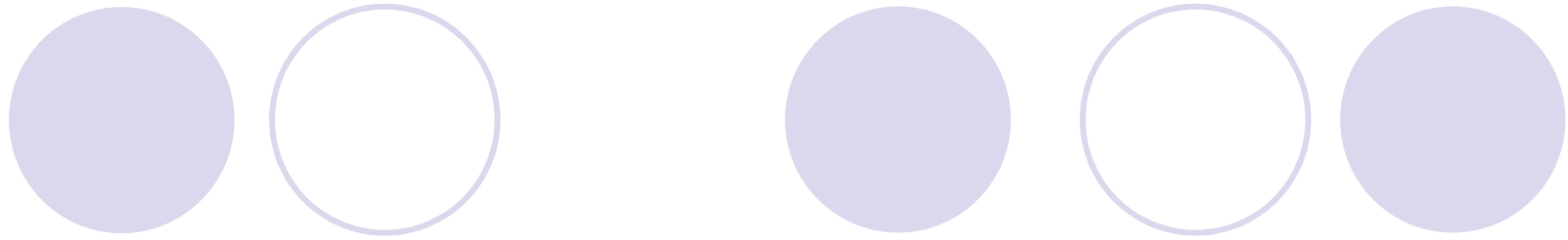


**COPING WITH CLIMATE CHANGE:  
AN ACTIVE AGROMETEOROLOGICAL  
LEARNING APPROACH  
TO RESPONSE FARMING**

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# 1. INTRODUCTION

***Farmers in Indonesia are confused  
by the consequences  
of climate change.***

**For a long time,  
there was nowhere to go.**

**Then the Indonesian government  
established Climate Field Schools.**

**Over somewhat less than a decade  
these CFSs are slowly becoming more  
frequent in number, based on earlier  
Integrated Pest Management  
Farmer Field Schools.**

**The CFSs want to equip farmers with practical adaptation skills, such as the handling of pests, diseases, droughts and floods.**

***This includes some observations in an experimental rice field, together with passive formal teaching on climatological issues such as clouds, rainfall, sun and wind.***

However, several preliminary evaluation attempts have shown quite some disappointing answers.

It is our experience that farmers want answers on an array of questions that go much beyond local climate issues.

*Those teaching at CFSs are not able to give answers to such questions because they were not trained for it.*

**Extensive experience with agrometeorological extension in Asia (China, India, Indonesia, Iran, Vietnam) and Africa has shown us that *giving and discussing answers and predictions related to climate does demand real dialogues between bearers of new knowledge and farmers.***



**We found that this must be organized in villages by bringing together frequently farmers and scholars/scientists, *in question and answer sessions and discussions, also used for training a new generation of extension workers.***

**But this must be based on  
farmers' own daily  
measurements of rainfall  
and observations of their own  
agro-ecosystems in rice.**

***This will lead to*  
*active learning of farmers.***

# A farmer was observing the rain-gauge observed by the researcher





Location: Karanglayung village  
Belongs to: Mr. Kaclek  
Half irrigated



Location: Sumbon village  
Belongs to: Mr. Chandra  
Rainfed



Location: Amis village  
Belongs to: Mr. Karwita  
Half irrigated



**This is a temporary new extension approach developed for the often found condition that no well trained extension is able to interact with farmers under conditions of a changing climate.**

**We have called it “Science Field Shops” and experimented with it since 2007 in Gunungkidul (Yogyakarta) and then Indramayu (NW coastal Java).**



## **2. HOW DO “SCIENCE FIELD SHOPS” OPERATE?**

**It is our experience  
over the past few years  
that the most useful and convincing  
preparedness sessions  
between farmers/scholars/scientists  
(trial “Science Field Shops”)  
*are those in which we are not only  
talking about rainfall measurements,  
their results and the related  
observations of crops and soil.***

We are also taking ample time  
to explain the background of  
climate change and its consequences  
in terms that lay-people  
can understand.

*And we discuss questions on these*  
*and other issues*  
*of their agricultural environment.*

Basically, we define such  
“Science Field Shops”  
as meetings in which scholars  
answer questions on vulnerabilities  
expressed by farmers.

*And where necessary*  
*the former follow this up*  
*at their institutes*  
*with supportive (literature) research*  
*and teaching with and to their students.*

The basic idea was based on Dutch so called “Law Shops”, that came into existence, in the Netherlands, particularly from the very early 1970s onwards, where defenceless people could consult lawyers free of charge about their rights and how to defend them.

**This gave lawyers and law students  
the opportunity to see (and discuss)  
where ordinary people  
got stuck in the process  
and what is needed  
to get them their rights.**

***Both sides learn from this procedure.***

**This was taken over elsewhere and the ideas behind such Law Shops are well worded by this quotation from Garth (1980):**

**“We cannot be content  
with the creation of systems of rendering free  
legal assistance to all the people  
who need but cannot afford  
a lawyer's advice.**

**This program must contribute  
to the success of the War on Poverty.**

***Our responsibility is to marshal  
the forces of law  
and the strength of lawyers  
to combat the causes and effects  
of poverty”.***

*We believe that*  
*"Science Field Shops"*  
*can and should indeed*  
*also contribute to combating*  
*increasing causes and effects*  
*of rural poverty*  
**in the present times**  
**of an often destructive**  
**climate change.**

Ideally, scholars and students  
should jointly provide  
an initial overview of answers  
to vulnerability issues/questions  
of farmers.

*Such initial answers should then  
be discussed with the farmers  
as to what the possibilities/choices/options  
are in solving their problems  
and how they see them from their realities.*

Through farmer research,  
they may find their own solutions,  
but a remaining dialogue  
with scholars is advisable.

*Measurements and quantification  
leading to  
cause and effect relationships  
is what science has to offer  
to empirical answers  
sought or found by farmers.*

This must be considered  
an effective way to connect  
applied scientists and students  
with actual problem solving  
in rural areas

*and to prepare future  
educational commitments  
on these vulnerabilities  
leading to climate field services.*

We use  
Roving Seminars in agrometeorology  
to start to induce such understanding,  
also outside Indonesia.

*We are convinced that*  
*“Science Field Shop” sessions*  
*are also suitable to get material*  
*for improved curricula of CFSs*  
*for the future training*  
*of Extension Intermediaries.*

**We believe that such curricula  
should be created  
together with farmers,  
*discussing their vulnerabilities  
and other questions,  
noting the difficulties experienced  
in the ongoing and recent  
growing seasons.***

*That is why we see*  
*“Science Field Shops”*

*as a start*

*for improved agricultural extension*

*that fits*

*a rural response to climate change.*



### **3. THE USE OF RESPONSE FARMING**

**Now we have the advantage that in agrometeorology, response farming has been developed decades ago.**

**It has been further developed into a Farm Adaptive Decision Optimization by widening its fields of operation but keeping the village as focus.**

**Response farming  
as an early set of  
agrometeorological services  
was created and promoted by  
Stewart (WHARF)  
and strongly supported by  
(among others)  
Gommes (FAO),  
Stigter et al.  
(TTMI/CAGM/Agromet Vision)  
and Weiss et al.**

**Response farming is a method of identifying and quantifying, statistically or otherwise, seasonal rainfall variability and (un)predictability and related risks, addressing these risks at the farm level.**

**The hypothesis is that solutions to farming problems may be found by improved forecasting of expected rainfall behaviour in the cropping season(s).**

*Response farming* means **adapting cropping to the ongoing rainy season** by guidance of agronomic operations, *using experiences of the past, preferably from interpretations of meteorological rainfall records,* with support from **traditional expert knowledge where available.**

## We are talking here about

onsets of rains, total amounts,  
durations (patchiness, including dry  
spells and their lengths),  
rainfall intensities,  
frequencies of rain days,  
average daily rates of precipitation,  
distributions of rainfall over the seasons,  
ceasing of rains etc.,  
that appear to be of interest to farmers.<sup>6</sup>

**Given the indications for increasing climate variability and change of the climate in terms of rainfall, this will have to be adapted to those new conditions, limiting the period in the past over which the experience can be used, and adapting the information to local soils and topography.**

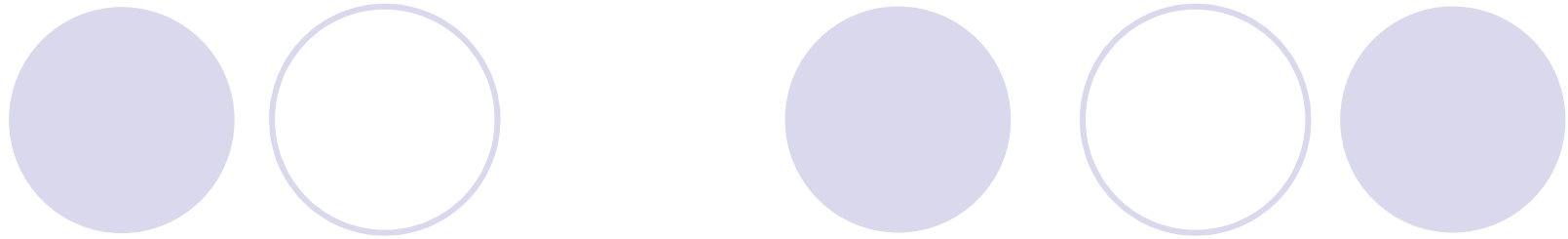
**Originally, response farming was limited to rainfall events, *but coping with weather and climate (and often soil) disasters as well as using windows of weather and climate (and often soil) opportunities are other forms of responding to weather and climate (and often soil) realities.***

**Services such as in advices on design rules on above and below ground microclimate management or manipulation, with respect to any appreciable microclimatic improvement: shading, wind protection, mulching, other surface modification, drying, storage, frost protection etc. belong to such “response farming” agrometeorological services.**

**Climate change brings complications to organized response farming but farmer and farming system differentiation is the real issue of agrometeorological alternatives in agrometeorological services under conditions of a changing climate.**





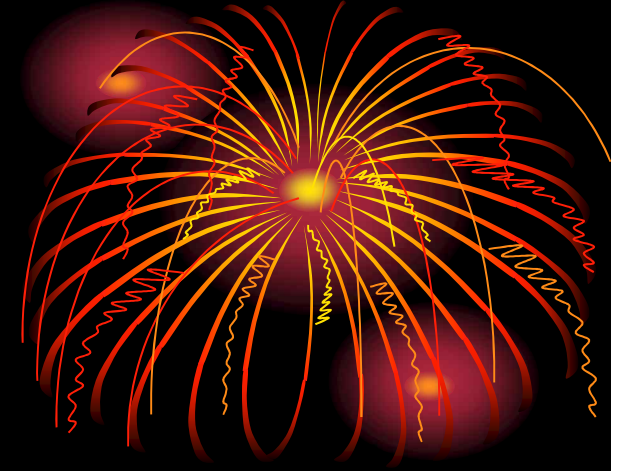


## **4. THE CONNECTION WITH EXTENSION**



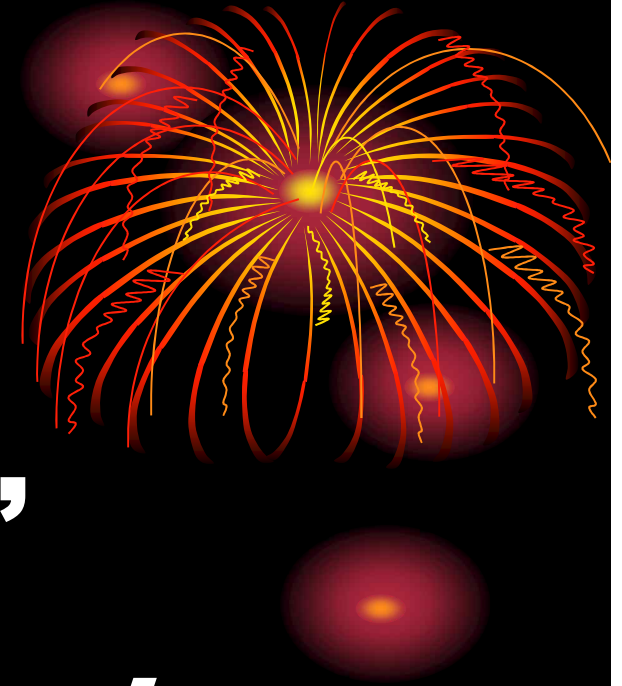
**There are two more classes  
of participants  
needed in such  
“Science Field Shops”.**

**First we jointly should create,  
among the farmers, so called  
“Farmer Facilitators”.**



**These are farmers**  
**who have shown**  
**that they quickly understand**  
**farmer problems**  
**related to**  
**the vulnerabilities discussed**  
**at the “Science Field Shops”.**

**They are farmers  
that can act,  
in and out of the  
“Science Field Shops”,  
to practice  
farmer to farmer extension,  
*in the sense that they  
“facilitate” the introduction  
of results of the discussions  
as well as services  
in farmer fields.***



**We distinguish two types of EIs.**  
**A first type of such intermediaries**  
**(the product intermediaries)**  
**will be the trainers, in due course,**  
**of the second type. The latter**  
***should replace the presently often***  
***confused or even failing***  
***or already disbanded***  
***extension services.***

***Those still sensibly active  
may be retrained and updated.***

**They need a few years of  
successfully participating in  
“Science Field Shops”,  
with farmers,  
“Farmer Facilitators” and  
scholars/scientists.**

**Then they should be establishing  
climate field services,  
throughout  
the growing season(s),  
with the farmers in their fields.**

**Members of NGOs could be part  
of this picture if/when trained  
the same way.**

**In the ultimate rural response  
to climate change  
this support from  
well trained extension  
intermediaries  
is crucial  
if we want  
*an institutionalized attempt  
to face the consequences  
of climate change  
in a real rural response.***

**“Although extension programmes have many different goals, most programmes fall into one of two basic categories:**

- *systems of communication that aim to change the behaviour of rural people;***
- *systems of communication that aim to change the knowledge of rural people;*”**

**“If government policy-makers, project managers or researchers direct the topics addressed and projects undertaken, then the purpose of extension is to change behaviour.**

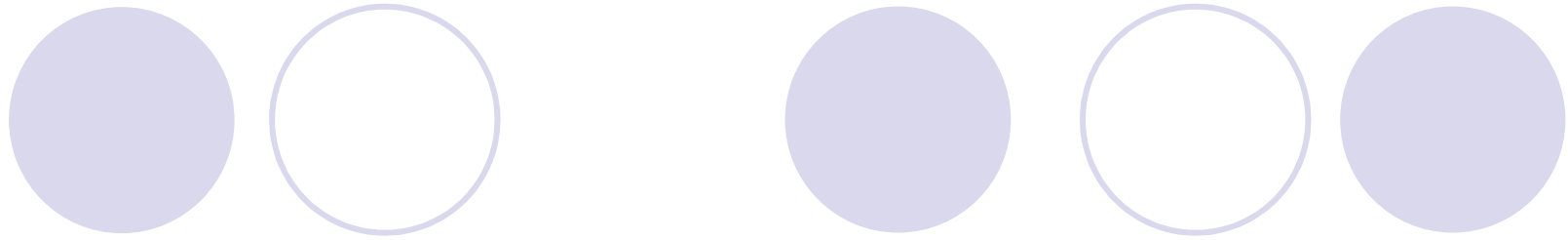
**This approach to extension has been variously described as directive extension, social marketing and propaganda”.**

“If farmers and other rural people direct the extension towards their own needs, then the purpose of extension is changing knowledge.

This knowledge helps rural people make their own decisions regarding farming practices.

This approach to extension is closely related to non-formal education and conscientization”<sup>53</sup>.

**From these quotations of**  
**Wikipedia (2012),**  
**it should be understood that our**  
**“Science Field Shops” are meant**  
**to belong**  
**to this last approach.**



## **5. FINAL REMARKS**

**Giving and discussing  
answers and predictions demand  
real dialogues.**

*Dialogic means are born from  
integrity and care.*

*These are properties implying modesty.  
There must be trust between parties.*

Originally we failed because  
farmer leadership was not convinced  
of our integrity and modesty.  
We did not succeed in being  
sufficiently credible.

*However, we succeeded in  
a new attempt without that leadership,  
and leaving farmers  
to organize themselves with self-chosen  
leadership among equals.*

**We are on our way to have  
a group of farmers believe  
in their attempts to understand and  
reduce (rice) yield differences  
with the past and between them;  
by actively learning about  
the consequences of climate change  
and where we can jointly  
do something to fight them.**