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# ***Alpha Lattice Design Analysis***

Design and analysis  
of experiments/Hinkel  
mann.-v.1.

Here is a vital new  
source of "need-to-  
know" information for

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cotton industry professionals. Unlike other references that focus solely on growing the crop, this book also emphasizes the cotton industry as a whole, and includes material on the nature of cotton fibers and their processing; cotton standards and classification; and marketing strategies.

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Combinatorial mathematicians and statisticians have made a wide range of contributions to the development of block designs, and this book brings together much of that work.

The designs developed for a specific problem are used in a variety of different settings.

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Applications include controlled sampling, randomized response, validation and valuation studies, intercropping experiments, brand cross-effect designs, lotto and tournaments. The intra- and inter- block, nonparametric and covariance analysis are discussed for

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general block designs, and the concepts of connectedness, orthogonality, and all types of balances in designs are carefully summarized. Readers are also introduced to the designs currently playing a prominent role in the field: alpha designs, trend-free designs, balanced

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treatment-control designs, nearest neighbor designs, and nested designs. This book provides the important background results required by researchers in block designs and related areas and prepares them for more complex research on the subject.

Handbook of Design

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and Analysis of Experiments provides a detailed overview of the tools required for the optimal design of experiments and their analyses. The handbook gives a unified treatment of a wide range of topics, covering the latest developments. This carefully edited collection of 25

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chapters in seven sections synthesizes the state of the art in the theory and applications of designed experiments and their analyses. Written by leading researchers in the field, the chapters offer a balanced blend of methodology and applications. The first section presents a



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historical look at experimental design and the fundamental theory of parameter estimation in linear models. The second section deals with settings such as response surfaces and block designs in which the response is modeled by a linear model, the third section covers

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designs with multiple factors (both treatment and blocking factors), and the fourth section presents optimal designs for generalized linear models, other nonlinear models, and spatial models. The fifth section addresses issues involved in designing

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various computer experiments. The sixth section explores "cross-cutting" issues relevant to all experimental designs, including robustness and algorithms. The final section illustrates the application of experimental design in recently developed areas. This comprehensive

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handbook equips new researchers with a broad understanding of the field's numerous techniques and applications. The book is also a valuable reference for more experienced research statisticians working in engineering and manufacturing, the basic sciences, and

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any discipline that depends on controlled experimental investigation.

Asian Regional Maize Workshop, 8: New Technologies for the New Millennium  
Proceedings of a Symposium, March 25-29, 1996, CIMMYT, El Batán, Mexico

A Step-by-Step Guide

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Using JMP

Application of  
Physiology in Wheat  
Breeding

A Practical Guide  
Dictionary of Plant  
Breeding

**This study was  
conducted with  
the overall  
purpose of  
comparing the  
performance of  
commonly used**

**incomplete block designs over that of the classical RCBD. Among the incomplete block designs, Lattice design and alpha lattice designs were employed. The comparison was statistically done mainly based on mean square**

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**errors and their corresponding CVs for each design. For this purpose, three datasets obtained from SARI were analyzed using CRD, RCBD, lattice and alpha lattice designs. The results of the soybean**



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**variety trial data  
containing 8  
treatments  
having two  
factors with 3  
replications at  
five different  
locations were  
used to assess  
the performance  
of RCBD over  
CRD. The result  
showed that 31,  
3, 53, and 13%**

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**precision increased with RCBD over CRD for four sites namely, Hawassa, Areka, Gofa and Bonga, respectively. The CV for CRD is 25.9, 19.2, 7.3 and 12.9% for the four sites above, respectively.**

**While that of RCBD is 22.6, 18.8, 5.9 and 12.3% respectively. This again confirms that RCBD is more efficient than CRD under those tested sites. The implication of the insignificant block effect is**

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**there is no need  
of block for this  
site.**

**This volume  
looks at a  
collection of the  
latest techniques  
used to quantify  
the genome-by-e  
nvironment-by-  
management  
(GxExM)  
interactions in a  
variety of model**

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**and plant crops. The chapters in this book are organized into five parts. Part One discusses high-throughput plant phenotyping (HTPP) protocols for plants growing under controlled conditions. Part**

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**Two present novel algorithms for extracting data from seed images, color analysis from fruits, and other digital readouts from 2D objects. Part Three covers molecular imaging protocols using PET and X-ray**

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**approaches, and  
Part Four  
presents a  
collection of  
HTPP techniques  
for crops  
growing under  
field conditions.  
The last part  
focuses on  
molecular  
analysis,  
metabolomics,  
network analysis,**

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**and statistical  
methods for the  
quantitative  
genetic analysis  
of HTP data.**

**Written in the  
highly successful  
Methods in  
Molecular  
Biology series  
format, chapters  
include  
introductions to  
their respective**



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**topics, lists of  
the necessary  
materials and  
reagents, step-by-  
step, readily  
reproducible  
laboratory  
protocols, and  
tips on  
troubleshooting  
and avoiding  
known pitfalls.  
Cutting-edge and  
practical, High-**

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**Throughput  
Plant  
Phenotyping:  
Review and  
Protocols is a  
valuable  
resource for both  
novice and  
expert  
researchers  
looking to learn  
more about this  
important field.  
Chapter 21 is**

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This topic is a  
unique attempt  
to  
simultaneously  
tackle theoretical  
and practical**

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**aspects in  
drought  
phenotyping,  
through both  
crop-specific and  
cross-cutting  
approaches. It is  
designed for -  
and will be of use  
to - practitioners  
and postgraduate  
students in plant  
science, who are  
grappling with**

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**the challenging  
task of  
evaluating  
germplasm  
performance  
under different  
water regimes. In  
Part I, different  
methodologies  
are presented for  
accurately  
characterising  
environmental  
conditions,**

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**implementing  
trials, and  
capturing and  
analysing the  
information this  
generates,  
regardless of the  
crop. Part II  
presents the  
state-of-art in  
research on  
adaptation to  
drought, and  
recommends**

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**specific protocols  
to measure  
different traits in  
major food crops  
(focusing on  
particular  
cereals, legumes  
and clonal  
crops). The topic  
is part of the  
CGIAR  
Generation  
Challenge  
Programme's**

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**efforts to  
disseminate crop  
research  
information,  
tools and  
protocols, for  
improving  
characterisation  
of environments  
and phenotyping  
conditions. The  
goal is to  
enhance  
expertise in**



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**testing locations,  
and to stimulate  
the development  
and use of traits  
related to  
drought  
tolerance, as well  
as innovative  
protocols for  
crop  
characterisation  
and breeding.  
While existing  
books related to**

**DOE are focused either on process or mixture factors or analyze specific tools from DOE science, this text is structured both horizontally and vertically, covering the three most common objectives of any**

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**experimental  
research: \*  
screening  
designs \*  
mathematical  
modeling, and \*  
optimization.  
Written in a  
simple and lively  
manner and  
backed by  
current chemical  
product studies  
from all around**

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**the world, the  
book elucidates  
basic concepts of  
statistical  
methods,  
experiment  
design and  
optimization  
techniques as  
applied to  
chemistry and  
chemical  
engineering.  
Throughout, the**

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**focus is on  
unifying the  
theory and  
methodology of  
optimization with  
well-known  
statistical and  
experimental  
methods. The  
author draws on  
his own  
experience in  
research and  
development,**

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**resulting in a  
work that will  
assist students,  
scientists and  
engineers in  
using the  
concepts covered  
here in seeking  
optimum  
conditions for a  
chemical system  
or process. With  
441 tables, 250  
diagrams, as well**

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**as 200 examples  
drawn from  
current chemical  
product studies,  
this is an  
invaluable and  
convenient  
source of  
information for  
all those involved  
in process  
optimization.  
Integrated  
Approaches to**

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Productivity in  
the New  
Millennium  
Quantitative  
Analysis of Data  
from  
Participatory  
Methods in Plant  
Breeding  
Cotton  
Analysis of  
Complete and  
Incomplete Block**



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Technology, and  
Production**

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Analysis for Tree  
Improvement**

Experimental Design  
and Analysis for  
Tree Improvement  
provides a set of  
practical procedures

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to follow when  
planning, designing  
and analysing tree  
improvement trials.  
Using many fully-  
worked examples, it  
outlines how to:  
design field,  
glasshouse and  
laboratory trials;  
efficiently collect  
data and construct

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electronic data files; pre-process data, screening for data quality and outliers; analyse data from single and across-site trials using either GenStat or SAS; and interpret the results from statistical analyses. The authors address the

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many practical issues often faced in forest tree improvement trials and describe techniques that will give conclusive results with the minimum expense. The techniques provided are applicable to the improvement of not

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only trees, but to crops in general. Building on the success of the first edition, this new edition has been fully revised and updated to relate to the latest commercially-available software packages for design generation

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(CycDesign) and data pre-processing and automated generation of programs for statistical analysis (DataPlus). For analysis, it now provides both GenStat and SAS programs as generated by

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DataPlus.

This book represents a pioneer initiative to describe the new technologies available for next-generation phenotyping and applied to plant breeding. Over the last several years plant breeding has

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experienced a true  
revolution.

Phenomics, i.e., high-throughput phenotyping using automation, robotics and remote data collection, is changing the way cultivars are developed. Written in an easy to



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understand style, this book offers an indispensable reference work for all students, instructors and scientists who are interested in the latest innovative technologies applied to plant breeding. Particle Accelerator

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Physics covers the dynamics of relativistic particle beams, basics of particle guidance and focusing, lattice design, characteristics of beam transport systems and circular accelerators. Particle-beam optics is

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treated in the linear approximation including sextupoles to correct for chromatic aberrations.

Perturbations to linear beam dynamics are analyzed in detail and correction measures are

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discussed, while basic lattice design features and building blocks leading to the design of more complicated beam transport systems and circular accelerators are studied.

## Characteristics of synchrotron

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radiation and quantum effects due to the statistical emission of photons on particle trajectories are derived and applied to determine particle-beam parameters. The discussions specifically concentrate on

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relativistic particle beams and the physics of beam optics in beam transport systems and circular accelerators such as synchrotrons and storage rings. This book forms a broad basis for further, more detailed studies

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of nonlinear beam dynamics and associated accelerator physics problems, discussed in the subsequent volume.

Introduction - why breed for drought and low N tolerance?;  
Conceptual

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framework -

breeding;

Conventional

approaches to

improving the

drought and low N

tolerance of maize;

Conventional

approaches

challenged; The

challenge of

breeding for drought



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and low N tolerance;  
Maize under  
drought and low N  
stress; Conceptual  
framework -  
physiology; Water  
and the maize plant;  
Nitrogen and the  
maize plant; Maize  
under drought and  
low N stress -  
consequences for

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breeding; Stress  
management;  
Drought; Low N  
stress; Statistical  
designs and layout of  
experiments;  
Increasing the  
number of replicates;  
Improved statistical  
designs; Field layout;  
Border effects from  
alleys; Secondary

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traits; Why use  
secondary traits?;  
How do we decide  
on the value of  
secondary traits in a  
drought or low N  
breeding program?;  
Secondary traits that  
help to identify  
drought tolerance;  
Secondary traits that  
help to identify low

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N tolerance:

Selection indices -  
Combining  
information on  
secondary traits with  
grain yield;  
Combining  
information from  
various experiments;  
Breeding strategies;  
Choice of  
germplasm;

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Breeding schemes;  
Biotechnology:  
potential and  
constraints for  
improving drought  
and low N tolerance;  
The role of the  
farmer in selection;  
What is farmer  
participatory  
research and why is  
it important?; What

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is new about farmer  
participatory  
research?;  
Participatory  
methodologies.  
Design and Analysis  
of Experiments

Case Study, at Bako  
Agricultural  
Research Center,  
West Shoa Zone,

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Ethiopia

Research

Methodology in the

Social, Behavioural

and Life Sciences

Designs, Models and

Methods

Applied Statistical

Methods in

Agriculture, Health

and Life Sciences

This guide is

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for genebank  
managers who  
are considering  
undertaking  
evaluation  
trials on the  
genetic  
material in  
their care.  
Know your  
target  
environment;  
Breeding to



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improve yield  
under adverse  
environments:  
direct  
selection for  
grain yield;  
Breeding to  
improve yield  
under adverse  
environments:  
indirect  
selection using  
drought-

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tolerance  
traits; Case  
studies of the  
application of  
approaches for  
breeding for  
drought  
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teaches crucial  
statistical  
methods to  
answer research

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questions using  
a unique range  
of statistical  
software  
programs,  
including  
MINITAB and R.  
This textbook  
is developed  
for  
undergraduate  
students in  
agriculture,

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nursing,  
biology and  
biomedical  
research.  
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students will  
also find it to  
be a useful way  
to refresh  
their  
statistics  
skills and to  
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options. The unique combination of examples is approached using MINITAB and R for their individual strengths. Subjects covered include among others

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data

description,  
probability  
distributions,  
experimental  
design,  
regression  
analysis,  
randomized  
design and  
biological  
assay. Unlike  
other

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biostatistics  
textbooks, this  
text also  
includes  
outliers,  
influential  
observations in  
regression and  
an introduction  
to survival  
analysis.

Material is  
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author's  
extensive  
teaching and  
research in  
Africa, USA and  
the UK. Sample  
problems,  
references and  
electronic  
supplementary  
material  
accompany each  
chapter.



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This book should be on the shelf of every practising statistician who designs experiments. Good design considers units and treatments first, and then allocates

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treatments to units. It does not choose from a menu of named designs. This approach requires a notation for units that does not depend on the treatments applied. Most structure on

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the set of observational units, or on the set of treatments, can be defined by factors. This book develops a coherent framework for thinking about factors and their

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relationships,  
including the  
use of Hasse  
diagrams. These  
are used to  
elucidate  
structure,  
calculate  
degrees of  
freedom and  
allocate  
treatment  
subspaces to

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appropriate  
strata. Based  
on a one-term  
course the  
author has  
taught since  
1989, the book  
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advanced  
undergraduate  
and beginning  
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courses.

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Methods and

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Incomplete

Block Designs

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Statistical

Performance

Analysis of

Complete and

Incomplete

Designs: A

Comparison of

RCBD, Lattice

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and Alpha

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Power System

Analysis and

Design

The Design and

Analysis of

Experiments

*Comparing*

*Efficiency of*

*RCBD and Alpha*

*Lattice*



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*Designs Case  
Study, at Bako  
Agricultural  
Research  
Center, West  
Shoa Zone,  
Ethiopia LAP  
Lambert  
Academic  
Publishing  
An overview of  
crop*

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*improvement;  
Analysis of  
genotype by  
environment  
interactions;  
Interpretation of  
genotype by  
environment  
interactions;  
Integrated  
approaches to  
plant*

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*improvement;  
Synthesis of  
strategies for  
crop  
improvement.  
A self-contained,  
mathematical  
introduction to  
the driving ideas  
in equilibrium  
statistical  
mechanics,*

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*studying  
important  
models in detail.  
Combinatorial  
mathematicians  
and statisticians  
have made a  
wide range of  
contributions to  
the  
development of  
block designs,*

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*and this book  
brings together  
much of that  
work. The  
designs  
developed for a  
specific problem  
are used in a  
variety of  
different  
settings.*

*Applications*

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*include  
controlled  
sampling,  
randomized  
response,  
validation and  
valuation  
studies,  
intercropping  
experiments,  
brand cross-  
effect designs,*

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*lotto and  
tournaments. The  
intra- and  
inter- block,  
nonparametric  
and covariance  
analysis are  
discussed for  
general block  
designs, and the  
concepts of  
connectedness,*

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*orthogonality,  
and all types of  
balances in  
designs are  
carefully  
summarized.  
Readers are also  
introduced to  
the designs  
currently playing  
a prominent role  
in the field:*



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*alpha designs,  
trend-free  
designs,  
balanced treatment-control  
designs, nearest  
neighbor  
designs, and  
nested  
designs. This  
book provides  
the important*

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*background  
results required  
by researchers  
in block designs  
and related  
areas and  
prepares them  
for more  
complex  
research on the  
subject.*

*Block Designs*

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*Drought  
phenotyping in  
crops: From  
theory to  
practice  
High-Throughput  
Plant  
Phenotyping  
Particle  
Accelerator  
Physics  
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*Developing  
Drought and  
Low N-tolerant  
Maize*

The choices of experimental design as well as of statistical analysis are of huge importance in field

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experiments.

The efficiency of alpha lattice design and randomized complete block design (RCBD) were compared in maize trials conducted in 2010 at Bako Agricultural Research Centre

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(BARC), in Ethiopia on 45 treatments to assess the efficiency of each in minimizing experimental error, coefficient of variation and error mean square for

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yield variable.  
The coefficient  
of variations  
(CV) compared  
to be 12.6 %  
for alpha  
lattice design  
and 14.6 % for  
RCBD  
respectively.  
The value of  
relative  
efficiency 1.35

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indicates that the use of alpha lattice design instead of RCBD increased experimental precision by 35 percent. The gain is considerable in terms of efficiency



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attained by using alpha lattice design which favors wider use of these designs under field conditions. Based on the results we conclude that alpha lattice designs are

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more efficient than RCBD. In order to increase the precision of agricultural field experiments researchers are advised to use alpha lattice designs for large number of

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treatments  
compared to  
RCBD.

The development  
and  
introduction of  
new  
experimental  
designs in the  
last fifty  
years has been  
quite  
staggering,

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brought about  
largely by an  
ever-widening  
field of  
applications.  
Design and  
Analysis of  
Experiments,  
Volume 2:  
Advanced  
Experimental  
Design is the  
second of a two-

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volume body of  
work that  
builds upon the  
philosophical  
foundations of  
experimental  
design set  
forth by Oscar  
Kempthorne half  
a century ago  
and updates it  
with the latest  
developments in

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the field.

Designed for  
advanced-level  
graduate  
students and  
industry  
professionals,  
this text  
includes  
coverage of  
incomplete  
block and row-  
column designs;

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symmetrical,  
asymmetrical,  
and fractional  
factorial  
designs; main  
effect plans  
and their  
construction;  
supersaturated  
designs; robust  
design, or  
Taguchi  
experiments;

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lattice designs; and cross-over designs. Although statistical design is one of the oldest branches of statistics, its importance is ever increasing.



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This book describes the principles that underpin good design, paying attention to both the theoretical background and the problems arising from real experimental

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situations.

This book describes methods for designing and analyzing experiments that are conducted using a computer code, a computer experiment,

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and, when possible, a physical experiment. Computer experiments continue to increase in popularity as surrogates for and adjuncts to physical experiments.

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Since the publication of the first edition, there have been many methodological advances and software developments to implement these new methodologies. The computer

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experiments  
literature has  
emphasized the  
construction of  
algorithms for  
various data  
analysis tasks  
(design  
construction,  
prediction,  
sensitivity  
analysis,  
calibration

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among others),  
and the  
development of  
web-based  
repositories of  
designs for  
immediate  
application.  
While it is  
written at a  
level that is  
accessible to  
readers with

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edition: • An expanded presentation of basic material on computer experiments and Gaussian processes with additional simulations and examples • A new comparison of plug-in



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methodologies  
for real-valued  
simulator  
output • An  
enlarged  
discussion of  
space-filling  
designs  
including Latin  
Hypercube  
designs (LHDs),  
near-orthogonal

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designs, and nonrectangular regions • A chapter length description of process-based designs for optimization, to improve good overall fit, quantile estimation, and Pareto

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optimization •

A new chapter  
describing  
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numerical  
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aspiration is the systematic measurement of the physical, physiological and biochemical traits (the phenome) belonging to a given individual or collection of individuals. Non-destructive or

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minimally invasive techniques allow repeated measurements across time to follow phenotypes as a function of developmental time. These longitudinal traits promise new insights into the ways in which crops

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