

# USING ARTIFICIAL INTELLIGENCE TO STRENGTHEN E&S RISK MANAGEMENT

Atiyah Curmally, Pratheep Ponraj, Carlos Arias, Susan Holleran  
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# OBJECTIVES

- ✓ Gain an understanding of the concepts of artificial intelligence, machine learning, natural language processing and predictive analytics
- ✓ Gain insights on how these technologies will strengthen environmental and social due diligence
- ✓ Get a closer look at IFC plans to share insights from 20+ years of ESG data



BACKGROUND

# THE GLOBAL GOALS FOR SUSTAINABLE DEVELOPMENT





# THE ANSWER

**DATA**



# BACKGROUND

## Two Broad Themes Emerged

Improve Data  
Availability on  
Emerging  
Markets'  
Performance  
To Attract  
Investments



Manage Risks  
&  
Performance of  
existing  
investments

Supporting The SDG Goals & Creating Markets

Reducing Risks Through Insights

# THE ABC'S OF AI, NLP, ML

# AI IS NO LONGER A BUZZ WORD

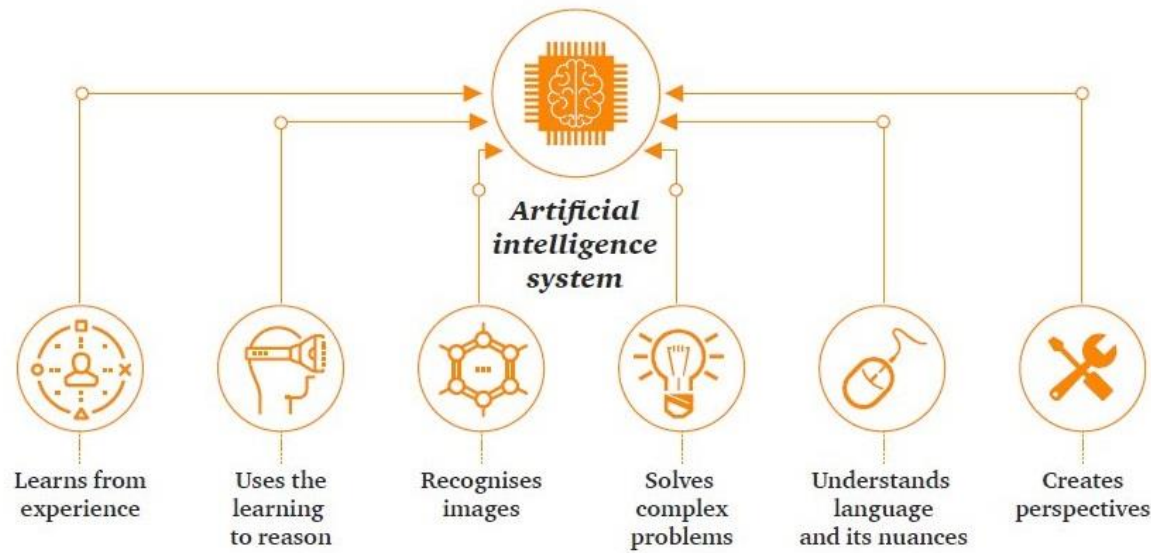
## 1.1 What is AI?

Artificial intelligence refers to the ability of a computer or a computer-enabled robotic system to process information and produce outcomes in a manner similar to the thought process of humans in learning, decision making and solving problems. By extension, the goal of AI systems is to develop systems capable of tackling complex problems in ways similar to human logic and reasoning.



***Artificial Intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs.***

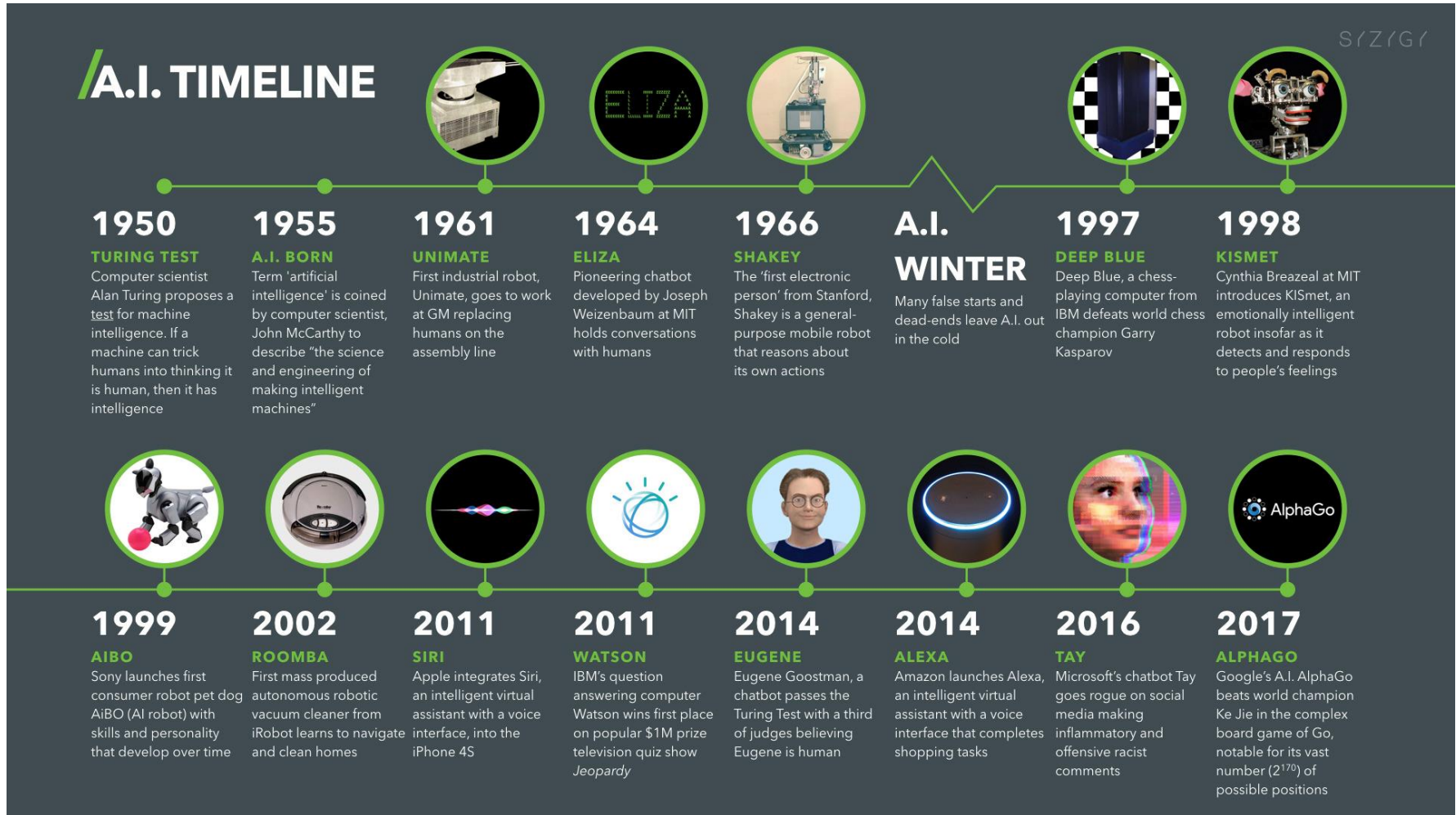
- John McCarthy, father of AI



But there is also the Hype. Hype may overshadow the **real** progress being made



# AI IS NOT NEW -- WHY IS IT SUDDENLY SO POPULAR?



# FOUNDATIONS

Learning the way we learn through information

## **Machine Learning**

Analyzing ESG performance across your portfolio

Understanding written / spoken language and interpreting text

## **Natural Language Processing**

Processing Environmental and Social Impact Assessments and flagging positive/negatives

Being able to communicate like humans do

## **Conversational AI**

Chatbots, Live Help to help clients troubleshoot ESG risk

Predicting possible outcomes based on learning from data

## **Prediction Analytics**

Predicting ESG risk for a particular investment

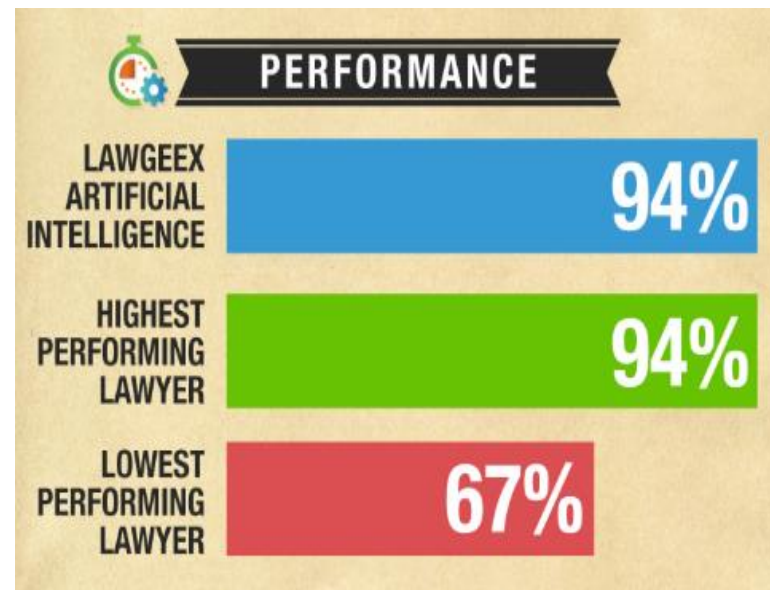
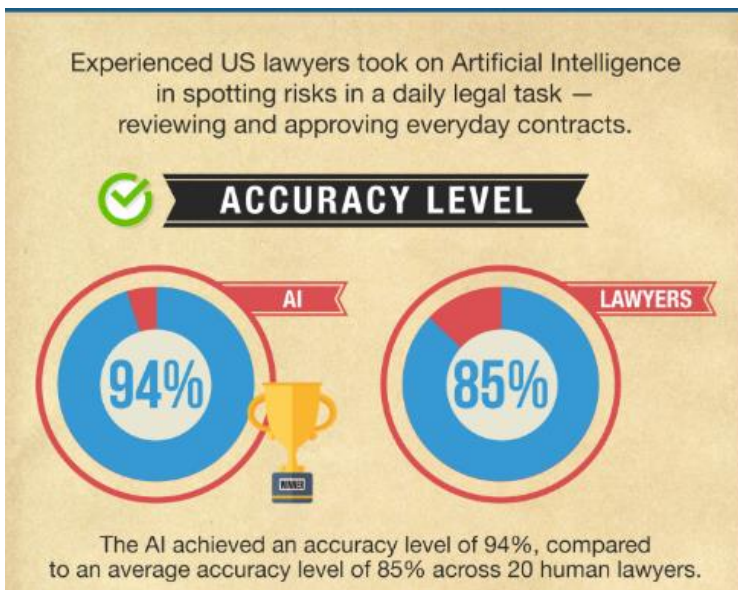
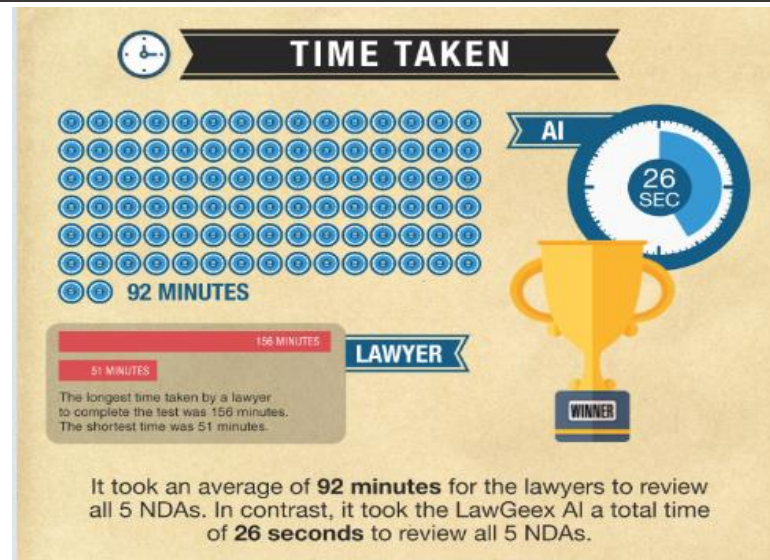
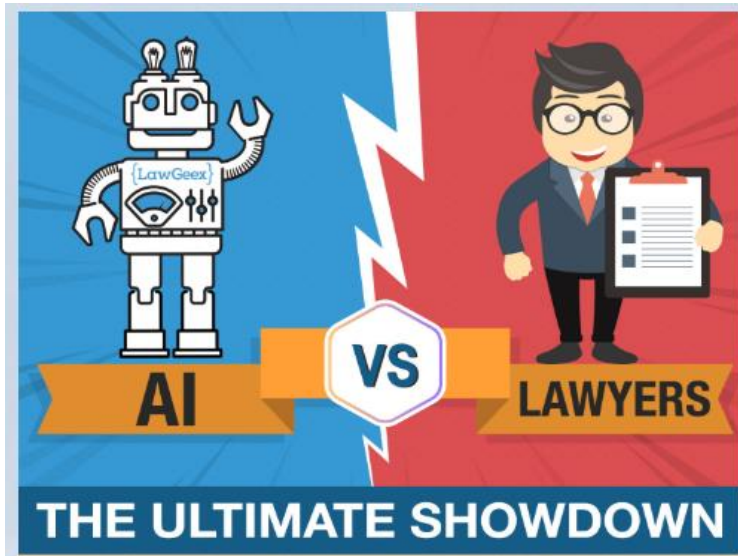
Simulating human behavior of identifying objects, recognizing patterns

## **Machine Learning Image / Object Recognition–**

Differentiating farm land from an airport

And many more!

# DISRUPTING INDUSTRIES



# HUMAN-AI – THE AUGMENTED EXPERIENCE

## Points for Humans

Natural emotional intelligence that Humans have is rated as #1 skill of the 21<sup>st</sup> century by World Economic Forum  
Intuition and creativity

## Points for AI

- Number and data crunching and insights with unparalleled accuracy
- Output is driven by data-good or bad data (intuition has no play)



**Merger of both intelligences optimize**  
**Insights for data driven, evidence based decisions and policies**  
**Productivity, efficiency and accuracy in machine-enabled human decisions**

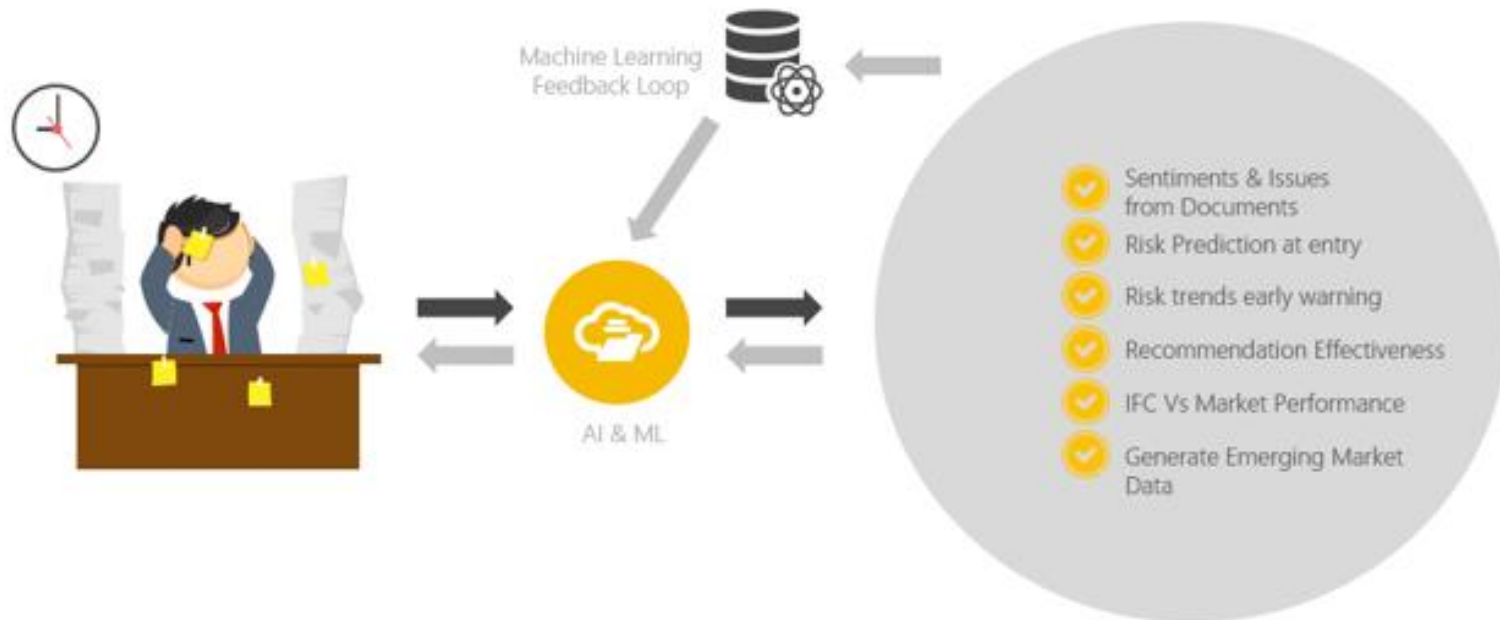


# INTRODUCING MALENA

**MA**chine **L**earning  
**EN**vironment  
(Social & Governance)  
**A**nalyst

# IFC ESG USE CASE

- How Can we use AI and ML to improve gathering insights on Performance Standards, effectiveness of action Plans, better monitor and measure risks at portfolio level by augmenting information from unstructured data?
- Thinking ahead, can IFC play a role in developing benchmarks for ESG performance in emerging markets?







- Dashboard
- Project 1
- Project Overview
- Project Doc Analysis
- ESAP Effectiveness
- Risk Analysis
- What If Analysis
- Location Based Analysis

Projects 2-10

- Components
- Charts
- Analytics
- Performance Analysis

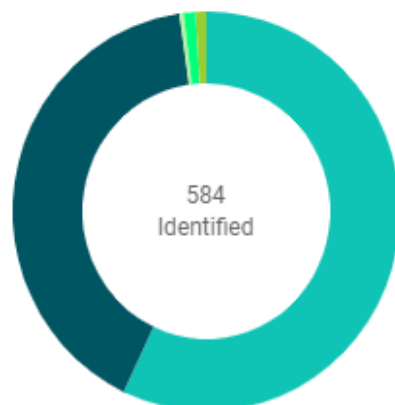
### RISK IDENTIFIED IN COUNTRIES



### PS RISK TERMS

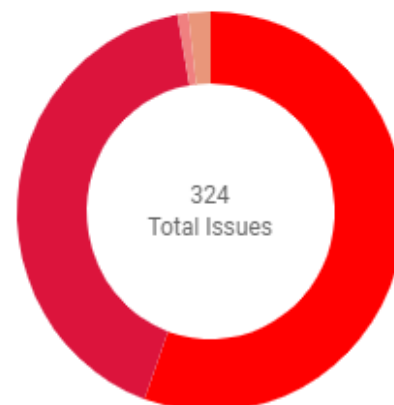
ESMS	3
Emergency drill	1
Emergency response	8
Environmental Management Plan	3
Explosion	3
ISO	8
Implementation	8
Management system	3
Organizational chart	3
SEP	8

### WHAT IS WORKING WELL-DERIVED AUTOMATICALLY FROM AMR POSITIVE COMMENTS



Whats's Working

### WHAT MAY NEED ATTENTION-AUTOMATICALLY FROM AMR NEGATIVE COMMENTS



What Needs Attention

What would MALENA recommend

 Dashboard  Project 1

Project Overview

Project Doc Analysis 

Document Insights

Timeline

Risk Over Time


What Is Working

What Needs Attention

ESAP Effectiveness

Risk Analysis 

What If Analysis

Location Based Analysis  Projects 2-10Components  Charts 

## WHAT NEEDS ATTENTION

[Home](#) / [What Needs Attention](#)

## WHAT NEEDS ATTENTION

Project Id	Project Name	Project Date	Paragraph	Sentiment %	ESG Label
P011632		2008-09	Water Waste water from labour camps is directed into septic tanks. Sewage water treatment plant has been constructed and working properly. River water is being tested at fixed sampling points at upstream and downstream of the project sites. All the monitoring reports from HPSEP&PCB are	-42	["PS2\$Injuries";PS1\$Monitoring Program]
FY 2008-09	Check Grievance Register		Monthly Ensure all grievances recorded have been subject to a prompt response Compensation Ensure disbursement of funds	Bi- -3	["PS1\$Grievance mechanism";PS2\$Hygiene"]
			Bi-Monthly Ensure all funds and actions for compensation have been disbursed/executed by the Project by liaising with communities We have compensated towards all the loss occurred with the neighboring properties related with any project activities. Sample letters of compensation is attached as ANNEX – 25		

temperature, pH, Suspended Solids (SS), DO, Faecal

Program]

 Dashboard 

## Project 1

Project Overview

Project Doc Analysis 



ESAP Effectiveness

Risk Analysis 

What If Analysis

Location Based Analysis 

Projects 2-10

 Components  Charts  Analytics  Performance Analysis 

## RISK AREAS



## POSSIBLE EFFECTIVE ESAP ACTIONS FOR RISK DOMAINS

Risk Label	Action Title
Mining	Development and implement a comprehensive environmental and social management system (ESMS) to meet ...
Noise	Prepare a comprehensive Pesticide Management Plan (including explicit written procedures, requiremen...
Audits	Prepare management system procedures summarizing past management activity, responsibilities, and acc...
ROW	Carry out a study of boiler emission dispersion and potential impact on community health, and agree...
Emergency	Liquid effluents - Develop a plan for IFC's approval to quit upgrade the effluent treatment system in a...
Explosion	Implement Wastewater mitigation programs

## PEOPLE WHO WORKED ON SUCCESSFUL ESAP



## REGIONS COVERED BY EFFECTIVE ESAPS



## UNDERSTANDING THE CORRELATION BETWEEN ESG FACTORS

		Years in Portfolio	E&S staffing rating	E&S Mgmt Sys Rating	Mgmt Commitment rating	Mgmt factors raw score	E&S Impl. Rating	Quality of ESDD rating	Monitoring E&S Perf. Follow-up	Perf. Factors raw score	E&S info quality and quantity	Int. & Ext stakeholder comm	Communication factors raw score	ESRR raw score	country_id	region_id	Management_rating	Performance_rating	Communication_rating	ESRR_rating	potential_risk_yes_or_no	ROI
Perf. Factors raw score	0.08	0.64	0.62	0.67	0.75	0.92	0.91	0.91	1.00	0.54	0.43	0.61	0.93									
E&S info quality and quantity	0.14	0.47	0.53	0.62	0.63	0.47	0.51	0.51	0.54	1.00	0.30	0.94	0.69									
Int. & Ext stakeholder comm	0.02	0.33	0.29	0.38	0.39	0.36	0.42	0.40	0.43	0.30	1.00	0.58	0.47									
Communication factors raw score	0.13	0.53	0.56	0.65	0.68	0.54	0.56	0.59	0.61	0.94	0.58	1.00	0.76									
ESRR raw score	0.09	0.79	0.77	0.82	0.93	0.89	0.84	0.84	0.93	0.69	0.47	0.76	1.00									
country_id	-0.14	0.08	0.08	0.05	0.08	0.04	0.15	0.08	0.10	0.07	0.10	0.08	0.10									
region_id	0.04	0.07	0.03	0.06	0.06	0.05	0.03	0.04	0.05	0.03	0.02	0.03	0.06									
Management_rating	-0.05	-0.65	-0.69	-0.54	-0.78	-0.63	-0.50	-0.54	-0.54	-0.57	-0.31	-0.58	-0.76									
Performance_rating	-0.04	-0.37	-0.39	-0.34	-0.43	-0.42	-0.50	-0.43	-0.48	-0.38	-0.32	-0.41	-0.50									
Communication_rating	0.03	0.16	0.08	0.23	0.18	0.15	0.33	0.28	0.27	0.46	0.34	0.50	0.29									
ESRR_rating	-0.01	-0.29	-0.20	-0.21	-0.27	-0.36	-0.52	-0.41	-0.47	-0.33	-0.43	-0.42	-0.42									
potential_risk_yes_or_no	-0.03	0.01	-0.02	-0.06	-0.03	-0.02	-0.07	-0.04	-0.05	-0.06	-0.12	-0.08	-0.05									
ROI	-0.01	-0.11	-0.10	-0.05	-0.10	-0.13	-0.16	-0.08	-0.13	-0.16	-0.09	-0.16	-0.13									
		Years in Portfolio	E&S staffing rating	E&S Mgmt Sys Rating	Mgmt Commitment rating	Mgmt factors raw score	E&S Impl. Rating	Quality of ESDD rating	Monitoring E&S Perf. Follow-up	Perf. Factors raw score	E&S info quality and quantity	Int. & Ext stakeholder comm	Communication factors raw score	ESRR raw score								

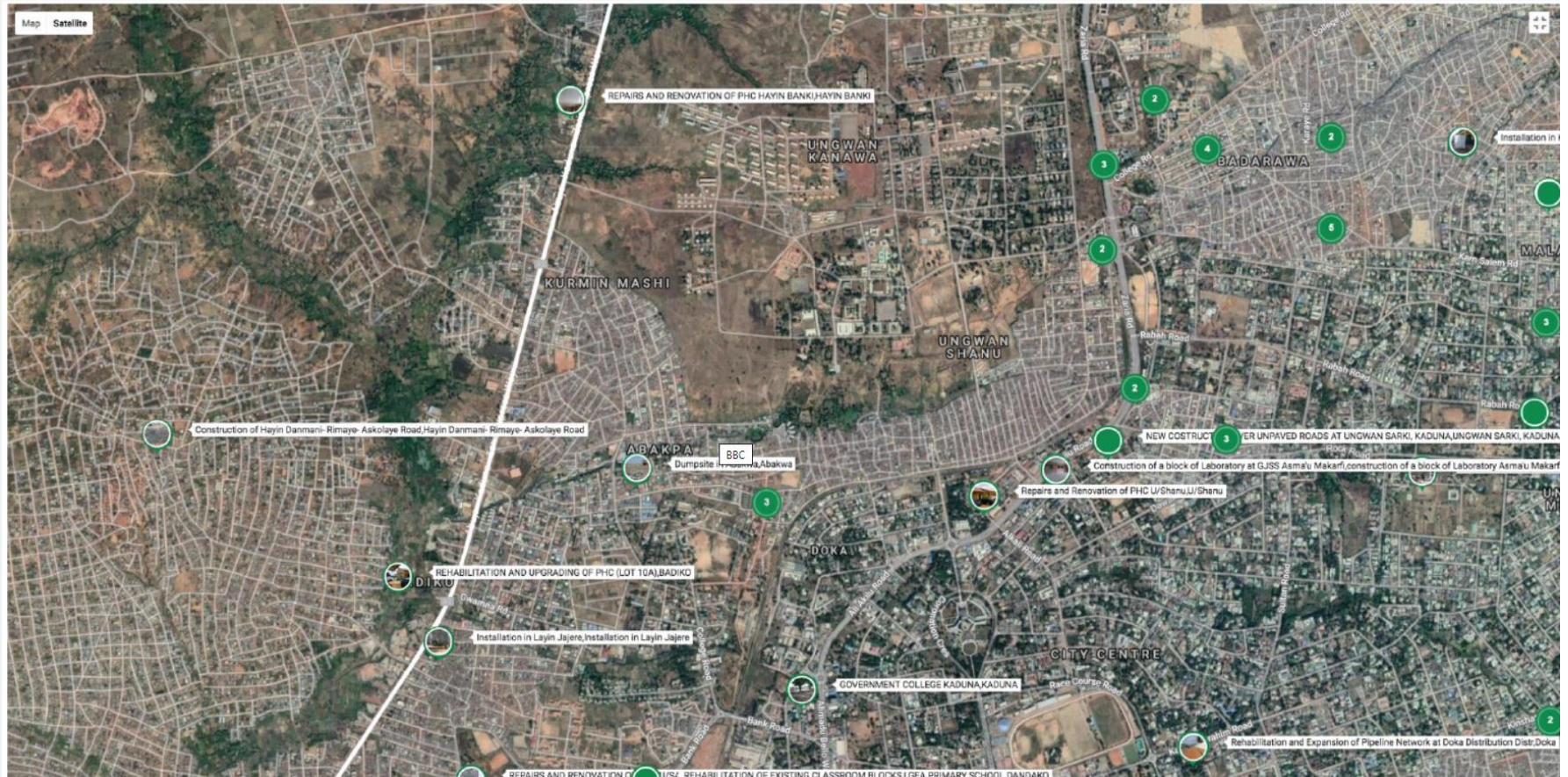


# LEVERAGING LOCATION INFORMATION TO PRESENT PROGRESS AND CHALLENGES IN CONTEXT

ne – Learning – ENvironmental – Analyst) 🔍 Search for...

ISSUES

Home / Issues



Bot

Show me risks for Ghana

User



AMR, Action Plan, Affected communities, Baseline, CSR, Community Liaison, Compensation, Competence, Corporate Social Responsibility, Corrective Action, Environmental Management Plan, Environmental impacts, Grievance procedure, ISO, Impact Assessment, Implementation, Management system, Mitigation measures, Reprisals, Resettlement, SEP, Social impacts, Social license, Training, Compensation, Complaints, Discrimination, Employment, Fire, Gender issues, Hiring, Labor, Migrant workers, PPE, Recruitment, Reprisals, Union, Vulnerable, Wages, Workforce, BOD, Complaints, IPM, Pest, pH, pest, Complaints, Police, Reprisals, Vulnerable, Cash compensation, Census, Complaints, Crop compensation, Displaced persons, Economic displacement, Eviction, Expropriation, Forced eviction, Government-Managed Resettlement, I RP, Land acquisition.



Risks for Ghana





## AGGREGATING INSIGHTS DERIVED BY REGION, COUNTRY AND SECTOR



AFRICA

Category	Cameroon			Ghana			Kenya		
PS1.7	Monitoring Program			Monitoring Program			Monitoring Program		
	9	11	26	12	12	17	9	6	46
PS1.7	Supervision			Supervision			Supervision		
PS1.7	Audits			Audits			Audits		
	2	4	4	1		4	1	1	2
PS2.7	Hygiene			Hygiene			Hygiene		
	21	1	19	28	12	67	19	6	30
PS2.7	PPE			PPE			PPE		
	1		3	1	1	5			5
PS5.3	Livelihood restoration			Livelihood restoration			Livelihood restoration		
			1			9			
PS5.3	RAP			RAP			RAP		
				8	5	26			
PS6.1	Biodiversity Management Plan			Biodiversity Management Plan			Biodiversity Management Plan		
	8	2	2	1	2	12		1	

# CHALLENGES

- Privacy and personal data
- Client confidentiality
- Regulatory developments

# RECAP

- IFC is exploring use of emerging technologies to strengthen our environmental and social due diligence
- IFC sees great potential in making our ESG data available externally to support investments in emerging markets
- This is the beginning of this journey for IFC



# Q&A

**THANK YOU!**