



Why We're Here: Barriers to Effectively Addressing Open Burning

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Barrier 1: Definition=Mitigation (or not)

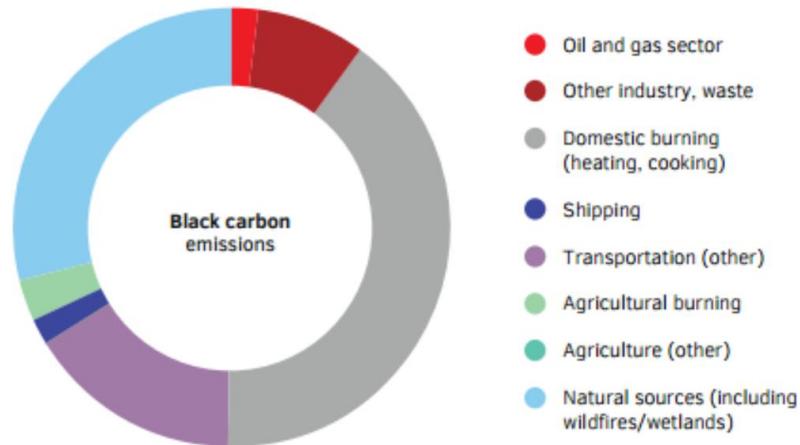
- Most limited: only residue burning of four major grains (wheat, oats, rice, corn,)
- Ignores other crops (soy, sugar cane, canola)
- Ignores other agricultural purposes (pasture, clearing, forest harvest practices, orchard understory, clearing)
- Ignores fires on lands not identified as “croplands”

Ignores fires that spread from set agricultural fires!
Incorrect Definition → Incorrect/No Mitigation

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Result: Underestimation!



Source: AMAP SPM SLCP 2015

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Proper Definition → Possible Action

- Use of fire for any purpose in agro-forestry sector, eg not merely “residue burning” but also:
 - ✓ Burning of crop stubble prior to next planting
 - ✓ Clearing of weeds/parasites in fields or orchards
 - ✓ Clearing of land for cultivation (“first use;” reclaiming; slash-and-burn)
 - ✓ Pasture burning to “renew” grass
 - ✓ Clearing of understory prior to lumber harvest
 - ✓ Does NOT include prescribed burns on wildlands or emergency fire prevention
- Includes primary “set” fire as well as fires that spread from the original fire

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Barrier#2: Misunderstood Impacts

- Episodic nature means minor long-term health impacts (at least, outside rural areas)
- “Ash fertilizes the soil, improves fertility
- Little climate impact due to “carbon neutrality”
- Little carbon impact because high OC portion means cooling, not warming
- Saves farmer time and money from dealing with straw/understory/pests/expense of clearing

“If you don’t see it, it isn’t happening...”

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Impacts: Poorer Health and Crop Yields, Higher Fertilizer Costs

- Burning a PRIMARY source of air pollution despite its EPISODIC or SEASONAL NATURE
 - ✓ Higher mortality from respiratory or cardiac illness, especially among young and elderly
 - ✓ Higher morbidity INCLUDING LONG AFTER FIRE EVENT from respiratory illness (asthma, pneumonia)
 - ✓ Increased mortality/morbidity due to accidents
 - ✓ Also in cities!
- Decreases soil fertility and crop yields by 25-30%
- Corresponding 25-35% greater need for fertilizer
- More brittle soils and fertilizer use → More run-off and water pollution; and secondary air pollution (?ammonia?)

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Impacts: Climate/Health, Multiplied by Wildfires

- Emissions, and therefore health and climate impacts, travel (regional/hemisphere)
- Wildfires spread from set agricultural fires lead to additional pollution and climate impacts.
- Set fires, AND the fires that spread from them, release methane, CO, CO₂ -- and black carbon.

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Impacts: Climate

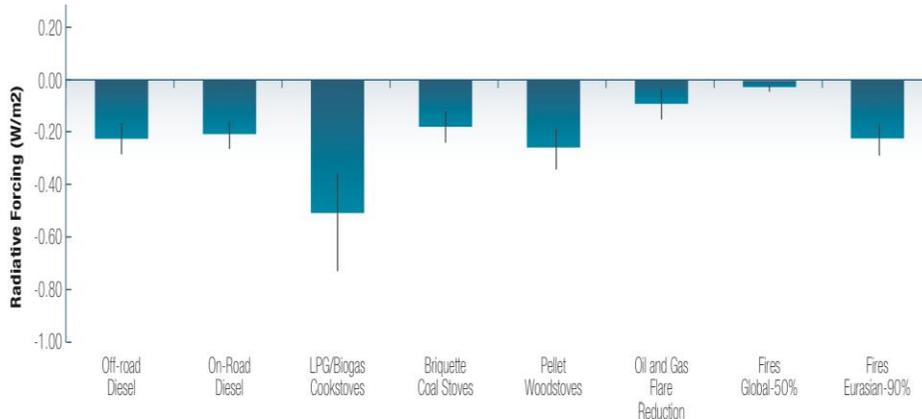
- Not (really) carbon neutral due to wildfire spread.
- Not carbon-neutral due to humus C loss
- Largest single BC source globally (36%)
- BC close to cryosphere (snow and ice)=more intense regional warming/glacier and snow melt
- Model-dependent: Model defines “impact” (or not)
 - Deposition?
 - Seasonal snow/ice?
 - Indirect effect (clouds)?

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Differences in Climate Impacts

Impacts of BC Reduction Measures



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Barrier#3: No Real Solutions

- “Farmers have always burned and will always burn”
- “Fire is a part of the agricultural system”
- “Fire saves money” (no long-term thinking)
- “Sometimes fire is necessary”
- “No-till leads to more pests, lower yields”

→ Traditional approach: “Managed” burns

“Message is that burning is positive, or at least OK”

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Farmer-focused, Soil Resource Approach

- **GOOD ALTERNATIVES EXIST: Burning very rarely “needed”**
- **Crop Stubble:**
 - **Low-Till: Incorporate stubble into soil**
 - **No-till/direct seed: Plant through stubble**
 - **Conservation agriculture: adds cover crops, manure**
 - **“Harvest” and monetize straw: for bedding, pellets...**
- **Clearing Understory: Mechanical removal and incorporation or production of wood chips**
- **Pasture: Harvest for hay (burning does not “fertilize”)**
- **Farmer Education and Incentives KEY**
- **Micro-financing/Sharing/Concessionary Loans**

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Lessons Learned:

- **NO-BURN ALTERNATIVES SUPPORT SDG GOALS: food security, greater economic security, adaptation/resilience, cleaner water, family health, soil and climate all benefit**
- **DON'T DEMONIZE THE FARMER: No farmer “likes” to burn, but lack reliable alternatives and support for transition – simply banning burning never works**
- **CHANGE CAN COME QUICKLY: Example of Baltics/Poland with EU accession; Argentina/Eastern Bolivia this decade**

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Workshop Issues

- **Definitional:**
 - Which fires count? (“four grains” to all-sector)
 - Which origins? (“four grains” to “all wildfire”)
 - Which land types? (croplands to all)
- **Modeling and Monitoring**
 - Global v. regional models; different treatment of deposition; transport to Arctic; seasonality of snow/ice cover; indirect effect
- **Mitigation methods, feasibility and impacts**
 - Crop yields, economic, health, climate benefits of different alternative methods

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